NEWSPAPER

MPUTERWORLD

WSWEEKLY FOR THE COMPUTER COMMUNITY

Second-class postage paid at Boston, Mass., and additional mailing offices ©1978 by CW Communications/Inc.

January 16, 1978

75¢ a copy;$18/year

il at Last, chin Eager To e His Work

ne Arnst
taff

NEW Y ears of harassment that included six lengthy police interrogations as well as apartment searches and seizure of personal papers, Dr. Valentin Turchin, a noted Soviet computer scientist, has arrived here with his family — empty-handed, but free.

A slight, graying man, Turchin had offended the Soviet government by protesting the treatment of dissidents, particularly Andrei Sakharov, the highest ranking dissenter in the Soviet science community, and for founding the unofficial Moscow branch of Amnesty International [CW, Aug. 13, 1975].

Had Turchin not agreed to emigrate permanently, the alternative was arrest and a possible prison sentence of up to 70 years for activities "harmful to the state."

Turchin has accepted a position as a research scientist at New York University's Courant Institute of Mathematical Sciences, where he will continue the work he started at Moscow's Institute of Applied Mathematics. That work was halted when he was fired in July 1974 for his political activities.

Turchin never held another job. For the past three years he, his wife and three sons lived on his wife's salary of 100 rubles per month — about $100 — earned as an engineer.

Forced to Renounce Citizenship

Turchin tried to leave the Soviet Union for some time. In 1975 he was denied a temporary exit visa to accept a position as a visiting scholar at Columbia University. When he renewed his request in July 1977, he was told he could leave — but only on permanent basis and with Israel as his final destination.

Turchin, however, is not Jewish and was not invited to immigrate to that country; further, he knew he could go anywhere he wanted once he left Russia.

By accepting these conditions, Turchin was forced to deny his Soviet citizenship — "the final harassment" by the government, he said in an interview here last week. "I hope that someday I will be able to return, at least to visit," but he said he would not consider living there again until "I can live as a normal human being with freedom of self-expression."

Turchin chose to immigrate to the U.S. because "this country showed more interest in human rights than Europe" and it was Americans who first tried to help him.

The computer facilities are also "far better" in the U.S. than in Russia "and my first thought on arriving was that at last I can continue my research."

Seeking Cybernetics in Language

Turchin, who has an excellent command of English, spoke openly about his experiences in Russia, but he was most animated when discussing his work. In the late '60s, he recalled, he developed a "meta-language" called the Recursive Functions Algorithms Language (Refal), which he described as a tool for depicting the process of evolution.

Refal "is not a purpose in itself, but a means for implementing certain developments in programming philosophy," Turchin said. The first stage of his work, developing a technique of programming in Refal, was almost completed when his research was interrupted by the state.

Although the students who worked with him tried to continue the research, little was accomplished, and Turchin now estimates it will take two to three more years to reach his final goal.

That goal is to develop a cybernetic approach to the

(Continued on Page 6)

Technology, Actions by IBM Spur Plunge in 1977 Prices

By Molly Upton
CW Staff

During the past year, a revolution has taken place in the prices of medium- and large-scale computer systems, recent figures compiled by *Computerworld* show.

Prices for hardware in these size ranges have fallen dramatically, riding a downward slope greased by technological developments as well as IBM's willingness to cut prices to become price-competitive.

The beneficiary of all this is unquestionably the user, who now has more alternatives available at startlingly lower prices. For example, an IBM 3032 with 4M bytes of memory costs less than the March 1977 price for a 2M-byte 370/158-3 — $2.1 million vs. $2.2 million — even though the internal operating speed of a 3032 is two to three times faster than a comparable 370/158-3.

But the most surprising development is the relative ranking of IBM in the price comparisons: At the beginning of 1977 IBM was clearly the high-priced alternative, but now the umbrella is gone and IBM is in a prominent position at the low end of the pricing totem pole.

CW asked vendors what systems they would bid against a 2M-byte 3031, a 4M-byte 3032 and a 6M-byte 3033. The "specifications" included 6 channels on both the 3031 and 3032 and 12 channels on the 3033. Quoted prices were to include CPU, memory, power supply, operator's console and channels.

Prior to the introduction of the 3033 and IBM's concomitant price reductions on its 370s last spring, the 158-3 and 168-3 were positioned firmly in the higher price bracket [CW, June 13].

A 168-3, with a ticket of $4.26 million for a CPU, power supply and 4M bytes, was topped only by Amdahl

(Continued on Page 6)

Also Has Communications

IBM 5100 Offspring Offers Disk

By Esther Surden
CW Staff

ATLANTA — IBM last week beefed up its 5100 desk-top system by unveiling a version with double-sided floppy disk storage, faster throughput, increased communications capabilities and improved screen management techniques for less than $10,000.

Also introduced with the 5110 were applications packages for general ledger, accounts payables and report generation.

Present 5100 users can upgrade their systems to the 5110 in the field for $3,800 to $5,800 depending on the model they have, IBM said. This upgrade price does not include the enhanced communications options and the parallel I/O channel feature, the firm noted.

IBM will continue to sell and support the 5100, according to a spokeswoman.

The combination of all the enhancements introduced allows the 5110 to operate three to 30 times faster than the 5100, the company claimed. Like its predecessor, the 5110 offers 16K to 64K bytes of main memory and either APL or Basic languages.

The language-handling techniques used have been enhanced, IBM said. Language interpreters for the system are contained in read-only memory on 72K-bit and 96K-bit modules, "providing twice the density" of that available on the 5100, IBM said.

While the system's keyboard and numeric pad are similar to those of the earlier system, some major changes have been made in the system's 1,024-character display. The 5110's display can accommodate several additional functions under program control.

One is the ability to write data anywhere on the screen. The 5100 only permits users to write data from the bottom of the screen.

Another function allows the screen to display data in both upper and lower case.

An optional audible alarm for the system signals for operator intervention or

(Continued on Page 4)

Plan to End LEAA Leaves System Planners in Dark

By Edith Holmes
CW Staff

WASHINGTON, D.C. — Attorney General Griffin B. Bell has proposed that the Law Enforcement Assistance Administration (LEAA) be abolished and replaced by a National Institute of Justice.

Bell's plan probably won't affect federal aid to state and local law enforcement information systems as long as the funding level for these programs remains the same, but it might affect the amount of federal money available at the planning stages of such projects, according to an LEAA official.

The reorganization plan does not address the question of LEAA support or funding of state and local law enforcement information systems, Robert F. Diegelman, director of LEAA's Policy Planning Division, noted, adding it is "impossible" to say whether computer funding will be affected by creation of the National Institute of Justice.

The basic structure of LEAA programs will remain intact and the states will have more flexibility in administering federal grants, Diegelman said.

Ceiling on Support

Bell's proposal calls for an overall ceiling on federal monetary support for planning. The states would be required to draw up three-year rather than annual plans for using the grants, according to

(Continued on Page 8)

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY
TM reg U.S Pat. Off

EDITORIAL

Editor	E. Drake Lundell Jr.
Deputy Editor	Ronald A. Frank
Managing Editor	Nancy French
Associate Editor	Donald Leavitt
Associate Editor	Esther Surden
Associate Editor	Molly Upton
Assistant Editor	Frank Vaughan
Washington Bureau	Edith Holmes
Staff Writers	Catherine Arnst Jeffry Beeler Timothy J. Scannell Brad Schultz
Chief Copy Editor	Cheryl M. Gelb
Copy Editors	Barbara T. VanScoyoc Susan Gerrard
Photography Editor	Ann Dooley
Editorial Assistant	Denise Petski
Editorial Cartoonist	Jim Orton
Bureaus:	
London	Roger Frampton
Munich	Hans-Jurgen Ballnath
Asia	Hidetsuna Sasaki
Contributors:	
Education	J. Daniel Couger
Legal	Roy N. Freed
Taylor Reports	Alan Taylor
Human Connection	Jack Stone

SALES

Vice President/ Marketing	Roy Einreinhofer
Advertising Administrator	Terry Williams
Display Advertising	Mary Anne Furlong
Classified Advertising	Donna Whalen
Recruitment Advertising	Kathy Steinberg
Sales Promotion Director	Jack Edmonston
Market Research	Kathryn V. Dinneen

CIRCULATION

Vice-President/ Circulation	Margaret Phelan
Circulation Manager	Barbara Jeannetti
Customer Service Rep	Peggy Kelly
Assistant	Maureen Burke

PRODUCTION

Manager	Lee Vidmer
Supervisor	Henry Fling
Assistant Manager	Peter Holm
Typesetting Supervisor	Donna Turnbull

Please address all correspondence to the appropriate department at 797 Washington Street, Newton, Mass 02160. Phone: (617) 965-5800. Telex: USA-92-2529

OTHER EDITORIAL OFFICES: England: Computerworld Publishing Ltd., 2 Bath Road, London W41LN. Phone: (01) 995-3352, Telex: 934287. W. Germany: Computerworld, c/o Computerwoche GmbH, 8000 Munchen 40, Tristanstrasse 11. Phone: 36-40-36/37. Telex: 5215350. Asia: Computerworld, c/o Dempa/Computerworld Company, Dempa Building, 1-11-15, Higashi Gotanda 1-chome, Shinagawa-ku, Tokyo 141. Phone: (03) 445-6101 Telex: J2424461.

Second-class postage paid at Boston, Mass., and additional mailing offices PN127420. Published weekly (except. a single combined issue for the last week in December and the first week in January) by CW Communications/Inc. Copyright 1978 by CW Communications/Inc. All rights reserved. Reproduction of material appearing in *Computerworld* is strictly forbidden without written permission. Send all requests to Marion Kibbee.

75 cents a copy: U.S.— $18 a year; Canada and PUAS — $28 a year; Europe and Middle East — $50 a year; all other foreign — $65 a year. Four weeks notice is required for change of address. Please allow six weeks for new subscription service to begin.

Computerworld can be purchased on 35 mm microform through University Microfilm Int., Periodical Entry Dept., 300 Zeeb Rd., Ann Arbor, Mich. 48106. Phone: (313) 761-4700. *Computerworld* is indexed: write to Circulation Dept. for subscription information.

CW COMMUNICATIONS/INC.

Board Chairman/ Publisher	Patrick J. McGovern
President	W. Walter Boyd
VP-Marketing	Roy Einreinhofer
VP-Finance	William P. Murphy
VP-Circulation	Margaret Phelan

ABP MCC MEDIA DATA FORM

POSTMASTER: Send Form 3579 (Change of Address) to Computerworld Circulation Dept., 797 Washington St., Newton, MA. 02160. ac

Asks Full Denial

IBM Mistrial Filing a 'Sham': U.S.

By Catherine Arnst
CW Staff

NEW YORK — IBM's recently filed motion for a mistrial in the U.S. vs. IBM antitrust trial "is wholly devoid of merit" and a "sham" and should be denied in full, the government charged in its response filed last week.

IBM's motion contended that the government changed its market definition claim through the testimony of Dr. Alan K. McAdams, the Department of Justice's chief economic adviser for the case, and asked Judge David N. Edelstein to abort the case [CW, Jan. 9].

In its response, the government charged that "IBM counsel knows full well that the government has not changed the market definition . . . IBM must have had other ends in mind for the filing, ends having nothing to do with the relief ostensibly sought . . .

"Aside from the obvious side effects of many of IBM's massive and frivolous motions as taxing of the time and energies of the government and the court, the instant IBM motion adds up to a 66-page attempt to disparage the testimony of Dr. McAdams," the government wrote.

IBM claimed in its mistrial motion that McAdams' definition of a general-purpose computer system, a central issue in the case, was inconsistent with that used by the government in its statement of triable issues because his definition took on different characteristics for different time periods.

The changes in McAdams' definition are analogous to the changes in the "passenger automobile," according to the government's response.

"The characteristics of the passenger automobile have changed dramatically over its life; for example, from Model T, to Chrysler Airflow, to the modern low-pollution, increased-mileage vehicle;, but the market for passenger automobiles can still be determined as the unchanging line of commerce, the 'passenger automobile.' The same is true of the line of commerce of general-purpose computer systems," it said.

"Government counsel have, repeatedly and unequivocally, stated that the government has not changed its position," the response paper said. The document referred to a remark made in court by government attorney Lewis Bernstein: "It is not relevant to these issues to consider the details of the specific mention that different people in the computer industry give to the term 'general-purpose computer system' when referring to an electronic digital computer system for some purpose other than attempting to delineate an economic market."

IBM's mistrial motion rose out of its "obvious attempts and purpose to obfuscate the market definition issue in this case," the government charged.

Funds for IRS System Axed

WASHINGTON, D.C. — Congressional concern over the privacy and cost implications of the Internal Revenue Service's (IRS) proposed Tax Administration System (TAS) has led to a decision to kill funding for that system for fiscal 1979.

Acting for the Carter Administration, the Office of Management and Budget decided against recommending to Congress that it budget 1979 funds for FAS after receiving letters from Representatives John E. Moss (D-Calif.) and Dante B. Fascell (D-Fla.) and six senators expressing "serious misgivings" over the system [CW, Jan. 9].

Because its present caseload threatens to outstrip its 20-year-old centralized tax accounting and collection system, the IRS will need to expand its computer system before too much longer. The agency proposed TAS more than three years ago as an alternative to building on to the old system.

Moss Planning to Retire

WASHINGTON, D.C. — Rep. John E. Moss (D-Calif.), long concerned over individual privacy in the context of federal computer systems, will retire from Congress at the end of this year.

The 62-year-old, 13-term congressman has decided not to seek reelection for many reasons — "primarily personal," according to a spokeswoman.

Moss said he feels a need to be relieved of the pressures of the office which have grown during his nearly 26 years in Congress. In addition, he would like to recover fully from a car accident he suffered last April and has a strong desire to be with his daughters and grandchildren.

Among the computer systems Moss has questioned on grounds of privacy and cost-effectiveness over the last few years are the Federal Bureau of Investigation's National Crime Information Center, the Internal Revenue Service's Tax Administration System, the Veterans Administration's Target system and the Social Security Administration's computer complex in Baltimore.

On the Inside This Week

NEWS

POS Options for Retailers Branch Out at Show 4
FBI Defends Use of OS/MVT by NCIC............ 5
Hopper: Faster CPUs Not Answer to Future Needs . 8
Service 'Psychs Out' Gridiron Teams' Strategies ... 9
Acpa Criticizes ACM's Breek With Soviets 10
Tennessee Tax Applies to In-House Software..... 12
Alabama High Court: Software Not Taxable 13
Something Fishy in Japan 14
DP Bills Keep Congress Busy.................. 15

EDITORIAL

Editorial: Keeping the Lines Open 16
Human Connection: Crooks Going Unnoticed 17
Taylor Report: Lost Controls Mar Systems 17
Auditor Must Be Included In Design Phase....... 20
Eureka Armpit: Programmer Extraordineire...... 21

SOFTWARE & SERVICES

User-Coded Requests Improve Decisions........ 25
'Cedmat' Manipulates Large Data Collections..... 27
'DMS/OS' Compresses PDS 28
Performance Monitor Helps Control TSO Use 29
Holding Company Banks on On-Line Programs... 31

COMMUNICATIONS

Datagrams Seen Boon to Network Users 33
Data Net Helps Optimize Firm's Operations 34
PTS-100 Gets Boost to Back 32 Terminals 35
BR Modular Terminal Built to Handle EFT........ 36

TERMINAL TRANSACTIONS

Oil Firm Uses CRT Net to Personalize Service 37

SYSTEMS & PERIPHERALS

Texans on Drives: The Bigger the Better.......... 39
Key-to-Disk Setup Eeses Data Entry Growth...... 40
MIC to Sponsor Seminar on Data Entry........... 44
Approach Eases Use of Old Software 45

MINIWORLD

Metal Firm Gets First IBM System/34 49
In-House System Eases Commercial Scheduling .. 50
System Adds Control to Cataloging Operation 55
System Eases Transfer Between Syfa, 360/370 ... 56
HP Minis Get More I/O, Memory Price Cuts 56

MICROCOMPUTING

Book for Learners Starts From Scratch.......... 59
Unit Gives Micros Remote Control.............. 61

COMPUTER INDUSTRY

'Defensibility' Behind IBM Unbundling........... 63
IBM Raises Dividend; Stock Split Coming?........ 63
Shift to Software Pricing Seen Growth Spur 64
IPI Sees Opportunity In CPU Independence 65
IBM's High Court Plea Unfounded: Greyhound.... 66
IBM-India Debacle Offers Blueprint for Future 69
Scope Focusing on Electrosensitive Printers 70
'Regulatory Maze' Seen Problem for U.S. Firms... 71
Innovative Marketing Seen Micro Use Key 74
DG Revenues Gain 47% In Quarter 76

FIRST CLASS

DOS, DOS/VS users: You are no longer restricted to the beginners' slope and the rope tow.

(You can now take the Syncsort chair lift right to the top!)

Call (201) 568-9700.

Located at the summit of Mt. Sort.

Congratulations, DOS and DOS/VS sort users of the world. You are about to get a fair shake at last!

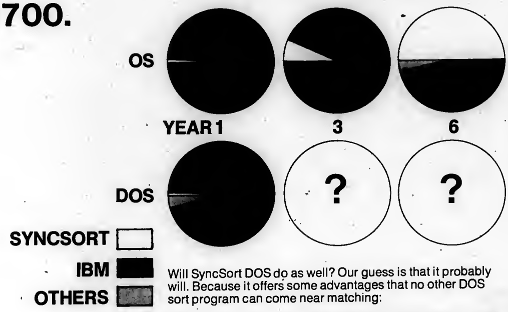
Until now you've been victims of a very curious sorting situation. While OS and OS/VS users could cut their use of machine and human resources by switching to SyncSort, you weren't so lucky.

You could only choose among lesser evils — a bunch of IBM DOS sorts that had grown "too soon old and too late smart." (Maybe it was the Computer Giant's revenge for your refusal to migrate upward on signal.)

Fortunately, with the introduction of our new SyncSort for DOS and DOS/VS, that's all history. About 1% of DOS and DOS/VS users — we call 'em the "leading edge" — have already discovered the pleasures of sorting with our new program.

Which means that the popularity of SyncSort DOS stands today almost exactly where that of our OS program stood a bare six years ago. The charts below show how it "evolutionized" OS sorting in this country:

Growth of SyncSort Popularity



Will SyncSort DOS do as well? Our guess is that it probably will. Because it offers some advantages that no other DOS sort program can come near matching:

SyncSort does more for less. Compared with its IBM counterparts, SyncSort simply gives you more mileage for less fuel:

- 30-40% reduction in Elapsed Time.
- 30% reduction in True CPU Time.
- 40-50% reduction in Disk Work Space.
- 30% reduction in I/O Time.

And it goes without saying that you'll get the same kind of technical support in DOS that has made us famous with OS users.

So come on up to the summit and enjoy the sorting view. It sure beats clinging to a slippery rope with frozen mittens!

OVERSEAS REPRESENTATIVES —

Brussels: CAP/GEMINI Belgium
Dusseldorf: CAP/GEMINI GmbH
Geneva: CAP/GEMINI Switzerland
Hague: CAP-GEMINI/PANDATA
Johannesburg: Computing Benefits Ltd.
London: GEMINI Ltd.
Melbourne: Shell Oil Co. of Australia
Milan: SYNTTAX
Paris: CAP/SOGETI PRODUCTS
Stockholm: BRA
Tel Aviv: ADVANCED TECHNOLOGY, Ltd.
Vienna: CAP/GEMINI GmbH

WHITLOW COMPUTER SYSTEMS Inc. 560 Sylvan Ave., Englewood Cliffs, N.J. 07632

CW at NRMA

POS Options for Retailers Branch Out at Show

By Ronald A. Frank
CW Staff

NEW YORK — Point-of-sale (POS) devices were branching out to provide more information to management at the National Retail Merchants Association (NRMA) annual convention here last week.

TRW Retail Systems, Los Angeles, showed a prototype of what was described as an "electronic timekeeper" that accepts magnetic-striped cards and can be interfaced with existing retail communications networks. Three of the wall-mounted terminals can be attached to one controller to capture employee timekeeping information that would be transmitted to a central DP center over existing lines. A system consisting of three terminals and a controller would cost about $6,000 to $8,000, a spokesman said.

Employees would enter data using credit card employee IDs and this data would be captured in real time to form the basis for payroll information. This type of system could save the interim data-entry process now required to get timekeeping information into a DP system, the company said.

IBM introduced a retail merchandising software system for System 32 users that is designed to operate in stores having sales of about $500,000, a spokesman said. The user-developed program runs on a CPU with 24K of main storage, an 80 char./sec printer and a 5M-byte disk. It reportedly calculates gross margin, gross mark-on and gross cost percentages by item class; provides salesperson productivity data; analyzes sales by time of day; and provides flash sales information.

Written in RPG-II, the software is available for a monthly license fee of $340 for a 12-month period.

For Smaller Stores

Several terminals priced at about $2,000, were introduced for smaller specialty stores. Datatrol, Inc. of Hudson, Mass., showed its IDT-6050 POS terminal that includes a printer, cassette, keyboard and electronics to capture sales data, provide inventory control and handle payroll information, accounts receivable and store security. The terminal costs $2,000 and reportedly can handle "more than 300 types of transactions."

A 16-digit display can handle major credit card numbers and product ID information. Options include bar code wand, remote display and credit card reader. Software is being developed to transmit data directly to a corporate DP center, a spokesman said. The communications capability is expected to add $500 to the cost of the basic system.

Sweda International of Pine Brook, N.J., unveiled its L 35 terminal designed for general merchandising applications. The unit is scheduled to be officially introduced soon and will cost $1,995 including cassette and printer for multipart sales slips, a spokesman said.

NCR showed its 8359 communications processing system designed to add on-line capabilities to the 255-726 food and mass merchandising terminal system as well as the recently introduced 2140 retail terminal.

March Delivery

The first configuration is scheduled for March to operate with the 255-726 and includes a 150 line/min printer, CRT console, cassette reader, CPU with 64K of storage and 9M bytes of disk. It will be priced at $81,000, a spokesman said.

The system is designed for multiline polling networks and will be programmedwith Cobol and NCR's Neat 3 language.

Data Terminal Systems, Maynard, Mass., showed its DTS 540 supermarket checkout system with scanning that reportedly costs 40% less than comparable IBM systems. A basic system with 15,000-item data base, scale, inter-register communications and Ans-R-tran communicatons costs $9,000 per lane. A typical 10-lane system costs $90,000 compared to $140,000 for an IBM system, a Data Terminal spokesman said.

Planning Aid Shown

IBM also showed its Planning Aid for Retail Information Systems (Paris) which was described as providing retail executives "with a road map for developing an integrated retail information system." The management system provides retailers with a five-manual series that includes such subjects as corporate planning, personnel planning and scheduling and merchandising. The Paris system is available at no cost to retailers, an IBM spokesman said.

Jay Corp., Chicago, Ill., showed its Model 630 programmable terminal designed for universal, rental and food service applications. The microprocessor-controlled unit is said to handle 22 standard departments. Programmable capabilities include pricing, taxable unit itemization and charge-posting functions. The basic unit costs $2,295 on 90-day delivery.

EDITOR/WRITER

We're one of America's largest business newspapers, and we have an excellent opportunity for someone with at least one year's reporting and writing experience and a knowledge of computers or the computer industry. You'll be reporting, writing and editing for the leading weekly newspaper for the computer community. Excellent chance to grow as we do. Good starting salary, depending on experience and broad benefits, including profit sharing. To apply, please send your resume or a detailed letter — including salary requirements to:

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

E. Drake Lundell
797 Washington Street
Newton, Mass. 02160
No phone calls please

An equal opportunity employer

IBM 5110 Features Disk

(Continued from Page 1)

error-condition, the company noted.

The primary difference between the 5100 and the 5110 is the mass storage each uses. The 5110 comes in two versions, but only one, the Model 1, accommodates the same 204K-byte tape cartridge used in the 5100.

In addition, the Model 1 can handle either one or two double-sided floppy disk drives for up to 2.4M bytes of random-access storage and an auxiliary tape drive.

The Model 2, with only diskette storage, can accommodate up to 4.8M bytes of diskette memory, IBM said.

The 5110 includes a number of functions in read-only memory to support file handling including initializing diskette, recovering data, compressing data, displaying label information and copying data, according to the firm. Data reportedly can be copied from tape to tape, tape to diskette and diskette to diskette.

Communications Capabilities

With the additional communications capabilities, the IBM 5110 can communicate either with an IBM 370 asynchronously in 2741 emulation mode or bisynchronously in IBM 2770 or 3741 emulation. The latter feature, available in June, can be programmed using APL or Basic, the company said, and allows the 5110 to interact with remote IBM 3s, 32s, 34s, 3741s or other 5110s.

To accompany the system, IBM also announced the 5103 models 11 and 12 printers. Users can "overlap the printing with applications processing," IBM stated. Both printers are bidirectional, capable of printing 80- and 120 char./sec respectively.

I/O devices can be attached to 5110 with either serial or parallel interfaces, the company added.

A low-end 5110 with Basic, 16K bytes of memory and a diskette capability costs $8,475. It costs $9,875 with both diskette and tape capability.

The 5114 diskette unit costs $4,150 and a second drive for the unit costs $1,900.

A system with both APL and Basic and 64K bytes of memory with diskette capability is priced at $17,125. Auxiliary tape units can be purchased for $1,850 each and the printers range in cost from $3,200 to $3,700.

NOTICE

The world's most successful computer data security system is

Secure.

It's available now from Boole & Babbage.

Boole & Babbage, Inc
Operations Division
[illegible] Oakmead Parkway
Sunnyvale, CA 94086

[illegible]
(408) 735-9550
Outside California [illegible]
(800) 538-1872

Sees No Conflict With Privacy Act

FBI Stands Behind Use of OS/MVT by NCIC

By Edith Holmes
CW Staff

WASHINGTON, D.C. — A Federal Bureau of Investigation official recently claimed the National Crime Information Center's (NCIC) use of IBM's OS/MVT operating system does not conflict with the Privacy Act of 1974, even though the system had been found to be less than secure for other agencies.

Conrad Banner, deputy assistant director of the FBI division that houses NCIC, contended the center's use of OS/MVT on an IBM 360/65 does not conflict with the decision made by the U.S. Comptroller General last year that blocked the U.S. Navy's use of a similar system to maintain personnel records [CW, Dec. 19].

The Comptroller General denied the use of OS/MVT not on the basis of the Privacy Act, but after studying the Navy's request for proposal (RFP) for the time-sharing system, Banner said. "The Navy wrote its specifications in hopes of satisfying the Privacy Act," he added.

"The language of the Privacy Act is broad," Banner continued, noting that neither the law itself nor the regulations written to help federal agencies implement it identify mechanisms for ensuring the confidentiality of records.

No Read Protection

On Jan. 14, 1977 and again on June 13, the Comptroller General told the Navy it could not accept a Computer Network Corp. (Comnet) proposal that OS/MVT be used as the basis for the time-shared personnel record system. Comnet's proposition was in violation of the Navy's own RFP that "established various requirements regarding the Privacy Act of 1974 and computer security," the Comptroller General said in his decision.

The Comptroller General quoted from the Navy's RFP: "Main memory protection must ensure the integrity of the user's area during operations . . . The proposal must include a detailed description of all security measures and procedures." He interpreted these RFP requirements to mean the system had to offer read protection.

While OS/MVT provides write protection, it cannot prevent the unauthorized reading of the records it governs. "The lack of read protection in OS/MVT is well known," the Comptroller General noted in his opinion.

Comnet had modified OS/MVT to provide "a measure of read protection in those situations where dumps are involved," the Comptroller General agreed, but these changes did not mean "full read protection." The Navy would not have been able to prevent a user's program from accessing areas of main memory outside the user's assigned segment, he concluded.

Apples and Oranges

In the final paragraph of his second decision against the Comnet proposal, the Comptroller General expressed the General Accounting Office's (GAO) belief in "the importance of the Privacy Act and related computer security requirements" and suggested this belief was the basis for his judgment.

Banner also maintained that the GAO decisions do not apply to the FBI's NCIC because while the center is an in-house effort, the Navy expected to go to an outside contractor for a time-sharing system that would have involved non-Navy users. To compare NCIC and the Navy's personnel record system is, therefore, to mix "apples and oranges," the FBI official said.

In the case of NCIC, the computer is under the control of the FBI and all the system's users — federal, state and local law enforcement agencies — have a right to all the data maintained by the center, Banner argued.

Sources inside and outside the FBI expressed concern that the bureau's plans to develop a communications system for switching criminal histories between state and federal users would accentuate the privacy problem inherent in OS/MVT.

Chiefly because of congressional concern, the Office of Technology assessment is now studying the creation of a national Computerized Criminal History (CCH) index and an NCIC/-CCH message-switching system [CW, Nov. 28].

One of the message-switching plan's strongest critics, Rep. John E. Moss (D-Calif.), recently received assurance from Walter M. Fiederowicz, associate deputy attorney general of the Justice Department, that the department "shares your views concerning the importance of this issue, and for this reason we have attempted to conduct our reexamination of this issue."

A reevaluation — "full and fair" — will precede any move the Justice Department and the FBI make to go ahead with NCIC message switching, Fiederowicz told Moss.

The congressman also received word from the White House that members of its staff "are quite familiar with the NCIC and feel, as you do, that expansion of that system should only proceed after the most thorough and careful consideration."

SMALL 370's CAN HAVE A MODERN TP SYSTEM

If you are the proud owner of a 370/115 or 125 or maybe a 360/40, you will have every right to expect your computer to run an efficient and sophisticated on-line system.

SHADOW II is the worlds most Advanced TP Monitor, and runs as happily on a 370/115 as it does on a 370/168.

Our medium and large size users like the enormous range of facilities provided with SHADOW II, and of course the world-renowned performance compared with any other system.

Our smaller users also appreciate these benefits of course. But they also find that their application programmers can write TP programs under SHADOW II as easily as writing in batch. And they get terrific performance without costly upgrades, because SHADOW II requires miserly quantities of Main Memory and CPU time. Just 2K of real storage under DOS VS for instance.

SHADOW II is a true Multi-tasking, Multi-threading system which allows you to grow from your first small TP applications, to your larger systems of a few years hence without a difficult and costly rewrite.

We don't ask the small user to accept an "Entry Version" with limited facilities and poor performance. SHADOW II is BIG on facilities but SMALL on resource requirements.

Get a BIG system without a BIG budget. Return the coupon for a copy of the SHADOW II Concepts and Facilities manual and a User Reference List.

Shadow II
The World's most advanced TP Monitor
altergo

Altergo Software Inc.
Wellesley Office Park
55 William Street
Wellesley
Massachusetts 02181
Telephone: (617) 237-6132

Please send me the Concepts and Facilities Manual right away.

Name ____________________

Title ____________________

Organization ____________________

Address ____________________

Zip __________ Phone __________

My computer is IBM __________ Op. System ______

Present TP Package ____________________

Our need is ☐ immediate
☐ 3-6 months
☐ over 6 months

Model / Characteristics	IBM 3031	Itel AS/5 7031	Burroughs B6817	CDC Cyber 173	NCR V8590	Univac[7]		HIS[11]	
						90/80-3	1100/80	68/80	68/DPS Level 1
Purchase Price CPU and 2M Bytes (No. of Channels)	1,000,000 (6)	1,100,000 (7)[2]	975,000 (40)	1,196,920 (12) 98,000 (60-bit) words	806,640 (6)	1,035,540 (6)[9]	1,447,670 (6)	3,337,200 (24)	1,312,913 (24)
Price/Mo With Maintenance (Lease Term in Years)	25,000 (4)	Not Available	23,515 (5)	25,687 (5)	20,718 (5)	22,813 (5)	28,060 (5)	65,385 (5)	33,045 (5)
Maintenance/Mo[1]	3,070	Not Available	4,551	3,621	3,017	2,733	2,420	7,058	4,253
Memory Size in Megabytes (Minimum-Maximum)	2-8	1-8	1.5-9	85,000-282,000 80-bit words	2-8	2-4	2-4	1-8	2-16
Memory Cycle Time (Nsec)	345-805[13]	Not Available	325[3]	400[4]	475[8]	457-588	800-100[10]	See Footnote 12	See Footnote 12
Machine Cycle Time (Nsec)	115	100	Not Available	50	56	98	50	Not Available	Not Available
Channels (Minimum-Maximum)	6	7	40	12-24	4-24	4-8	8	58-224	56-224
Price/Channel					14,440	15,840[9]		Not Available	Not Available
Memory Buffer	32K	32K	No	See Footnote 5	No	No	16K	2K	2K

[1] IBM maintenance is minimum monthly charge, 10 hour/day, 5 day/week. Burroughs maintenance is 24 hour/day, 7 day/week.
[2] Seven standard channels, six operational.
[3] Read access is 325 nsec.
[4] Effectively 50 nsec.
[5] Scheduling arrangement for peripheral processor units and CPU to access main memory. Buffer could be one to 12 CDC's 60-bit words. System quoted has 10 peripheral processor units.
[6] Also features four-way interleaving.
[7] Univac prices include software.
[8] Five block, one byte multiplexers.
[9] For each block multiplexer.
[10] Speed is 650 nsec for 16 bytes in "rear memory" and 100 nsec from "forward memory" to CPU.
[11] HIS expects to offer other systems in this range based on Level 66 with Gcos operating system. The 66/DPS units have Multics operating system. The 68/80 is what HIS would have bid prior to October 1977; the 68/DPS is the firm's current offering.
[12] Memory access time is 750 nsec.
[13] Depends on type of work being done.

CW Chart

Revolution in System Pricing Takes Place in '77

(Continued from Page 1)

Corp.'s 470V/6-II's $4.6 million ticket.

The 2M-byte 158-3 was alone at the top with a price of $2.2 million until Amdahl introduced the 470V/5 with a sales tag of $2.4 million.

Reviewing the 370 price changes, multiple motivations seem clear. Not only was IBM becoming price-competitive with its 370 line, but it was setting the stage for the 30 Series and its pricing.

But IBM was not the only one adjusting its prices and products last spring. After a flurry of consultation with slide rules, several other firms also reduced prices, especially in the larger systems area.

For instance, Burroughs Corp., Honeywell Information Systems, Inc. and Amdahl all adjusted prices on systems competing with the 168-3, indicating their intent to remain to some extent under IBM's price — or at least close to it.

Many of these vendors apparently predicted the pricing range of the 30 Series, as few felt the need to reprice after the 3031 and 3032 were announced. In November, HIS was the last to lower prices with its revamped systems called the Level 68/Distributed Processing Systems (68/DPS).

The Level 68/DPS series shows a sizable price reduction compared with its predecessor Level 68/80 range.

In the ranges of the 3031, 3032 and 3033, HIS is no longer the high bidder. As a result of the changes, HIS has abandoned its stratospheric position and ranks in the bottom half of the pricing on the 3032 field.

Although IBM was relatively unsuccessful in abandoning the umbrella pricing for its 168-3, which had only three competitors with higher price tags, the new price of IBM's 158-3 was underbid by only one machine, Control Data Corp.'s Cyber 173.

Those topping the 168-3 price were CDC's Cyber 175, Amdahl's 470V/6-II and the HIS 66/60. The prices include CPU, 4M bytes of memory,

(Continued on Page 7)

Turchin, Now in U.S., Eager to Get Back to Work

(Continued from Page 1)

theory of evolution which encompasses the "evolution of everything, including moral principles," he said. "I call it meta-science — the science of science, the theory of how to create theories."

Although excited by discussion of his work, Turchin became subdued and answered quietly when asked what had happened to the research he had already completed. He said he was allowed to bring nothing out of Russia that pertained to his work, but he hopes progress will not be slowed too much by this loss.

"By the time I was fired, we had already published the essential portion of what is needed," he said. These theories were recently published in English by Columbia University Press in *The Phenomenon of Science, A Cybernetic Approach to Human Evolution*. The book "attempts to establish a relation between the pursuits of science and the overall ethical and moral concerns of society," according to the jacket notes.

Refal is largely machine-independent, but there will still be some problems implementing it on non-Soviet computers, Turchin said.

The differences between the equipment available to him here and in Russia are astounding, he added.

Unreliable Hardware

The hardware in the Soviet Union doesn't compare in reliability, according to Turchin. "Several top institutions have contemporary models which work very badly, with printers that constantly jump or miss letters.

"When I first saw an IBM printout, I was amazed that the printing could be so legible," he said. "Also, you cannot imagine how many sufferings we had with magnetic tape because it never worked." However, he did praise Russian electronics for being better.

Noting that Russia imported several different models of the IBM 360 line in 1970, Turchin said the Russian EC system is "a complete imitation of those, including the software." Soviet computer technology will therefore always lag behind the U.S., he believes, because the country didn't develop its own.

Data processing in the Soviet Union equals only 1% of its use in the U.S., Turchin estimated. When computers first emerged in Russia, they met ideological opposition; cybernetics was defined as "a bourgeois pseudoscience whose meaning is to distract the masses from class war," he said.

However, once it was realized that computers were essential to military and scientific projects, that position was reversed. Now, a computer is a symbol of prestige and progress and, because economic considerations are secondary to Soviet organizations, computers are used even at times when it would be less expensive to do the same work by hand, he said.

Because of their unreliability, however, the computers used in business applications are "always the object of jokes." The important scientific institutions generally have access to foreign-built computers and have better luck, he said.

Russian scientists also depend heavily on foreign research and follow closely what is done in the West, Turchin said. He applauded the Association for Computing Machinery (ACM) for its recent decision to cut all ties with Soviet computer scientists "until the climate of intellectual freedom clearly improves" [CW, Dec.12].

"I am absolutely sure ACM's decision is correct. If more organizations took that lead, it would constitute a serious pressure. It is a very correct decision and an important example," he said.

Russia fears the loss of cooperation with the Western scientific community, but pays little attention to threats, Turchin said. "It is important for groups to take harsher steps that will really hurt Russia," he said.

Turchin will reside in the Forest Hills section of Queens, N.Y., which he likes because it has trees and open spaces as well as a growing Russian community. He has managed to negotiate the New York subway system but, like most New Yorkers, he bemoans the 35 minutes it takes to reach his office in downtown Manhattan.

Model Characteristics	IBM 3032	Amdahl 470V/5	Itel AS/8 7032	Burroughs B7811	CDC Cyber 175	Univac[6]		HIS[8]	
						1100/81	1100/82	68/80 (2 CPUs)	68/DPS Level 2
Purchase Price CPU and 4M Bytes (No. of Channels)	2,142,000 (6)	2,650,000 (6)	1,960,000	2,611,540 (26) For 4.5M Bytes	3,353,623 (12) 131,000 60-Bit Words	1,621,690 (6)	2,547,410 (6)	4,010,130 (24)	2,099,467 (24)
Price/Mo With Maintenance (Lease Term in Years)	51,360 (4)	72,675 (4)	Not Available	56,555 (5)	69,425 (5)	35,135 (5)	59,565 (5)	79,267 (5)	50,669 (5)
Maintenance/Mo[1]	6,820	9,150	Not Available	7,100	7,566	2,675	4,530	6,662	6,467
Memory Size in Megabytes (Minimum-Maximum)	2-6	2-6	2-16	3-6	131,000-262,000 60-Bit Words	2-16	4-16	1-6	2-16
Memory Cycle Time (Nsec)	320	300	Not Available	See Footnote 2	400[4]	600-100[7]	600-100[7]	See Footnote 9	See Footnote 9
Machine Cycle Time (Nsec)	80	32.5	72	Not Available	25	50	50	Not Available	Not Available
Channels (Minimum-Maximum)	6-12	6	6-16	26	12-24	6-52	6-52	56-224	56-224
Price/Channel	360,000 (6 channels)		50,000			54,075 (4 Channels or 1 Block Multiplexer)	54,075 (4 Channels or 1 Block Multiplexer)	Not Available	Not Available
Memory Buffer	32K	16K	64K	12K[3]	See Footnote 5	32K	64K	2 Buffers Of 2K Each	2 Buffers Of 2K Each

CW Chart

1. IBM maintenance is minimum monthly charge, 10 hour/day, 5 day/week. Amdahl and Burroughs rates cover 24 hour/day, 7 day/week.
2. Access time is 50 nsec/byte.
3. Consists of 12K program buffer plus data buffer and storage as well as central data register.
4. Effectively 50 nsec.
5. Scheduling arrangement for peripheral processor units and CPU to access main memory. Buffer could be one to 12 of CDC's 60-bit words.
6. Univac prices include software.
7. Speed is 600 nsec for 18 bytes in "rear memory" and 100 nsec from "forward memory" to CPU.
8. HIS expects to offer other systems in this range based on Level 88 with Gcos; the 68/DPS units have Multics operating system. The 68/60 is what HIS would have bid prior to October 1977; the 68/DPS is the firm's current offering.
9. Memory access time is 760 nsec.

Pricing Revolution Hits

(Continued from Page 6)

operator's console and power supply, but no channels.

Prices of systems bid against the repriced 168-3 ranged as much as 32% below IBM's price (CDC's Cyber 174) to 10.7% above IBM's price (HIS 66/60). For the 158-3 range, prices varied from 16% below IBM (CDC's Cyber 173) to 57% above (Amdahl 470V/5).

Indeed, in the repriced 168-3 area, IBM left considerably more difference — 32% — between its price and that of its lowest priced competitors, CDC with the Cyber 174, than was the case with the entire 30 Series.

The largest variations in price among systems competing with the 3031, 3032 and 3033 are in the 3031 field and range from only 19% below (NCR Corp.'s V8590) to 44% above (Univac 1100/80).

In the 3033 area, the other machines ranged from 2.9% below IBM's price (Amdahl 470V/6-II) to 36.9% higher (Univac 1100/84).

The 3032 competitors range from 14.9% below IBM's price (Univac 1100/81) to 6.3% above (CDC Cyber 175).

The 30 Series CPUs are clearly in the lower end of the pricing range. Looking at price alone, the 3033 is underbid only by the Burroughs B7821 and the Amdahl 470V/6-II.

In the 3032 area, the IBM offering is in the middle, with HIS' repriced offering of the Level 68/DPS Level 2, Itel Corp.'s AS/6 Model 7032 and Univac's 1100/81 below IBM in price.

The only models priced below the 3031 are the Burroughs B6817 and NCR's V8590.

Model Characteristics	IBM 3033	Amdahl 470V/6-II	Amdahl 470V/7	Burroughs B7821	CDC Cyber 175	Univac[6]		HIS[9]	
						1100/83	1100/84[8]	68/80 (4 CPUs)	68/DBS Level 5
Purchase Price CPU and 6M Bytes (No. of Channels)	3,605,000 (12)	3,500,000 (18)	3,700,000 (12)	3,526,000 (12)	3,998,629 (12) 262K 60-Bit Words	4,326,148 (12)	4,936,866 (12)	6,183,270 (24)	4,031,325 (24)
Price/Mo With Maintenance (Lease Term in Years)	77,480 (4)	96,250 (4)	Not Available	73,969 (5)	62,666 (5)	63,565 (5)	95,350 (5)	123,386 (5)	99,779 (5)
Maintenance/Mo[1]	8,320	10,200	10,200	10,900	6,632	6,695	8,120	12,840	9,271
Memory Size in Megabytes (Minimum-Maximum)	4-6	4-6	4-16	3-6	131,000-262,000 60-Bit Words	6-16	8-16	1-8	2-16
Memory Cycle Time (Nsec)	290-464[11]	300	260	See Footnote 2	400[4]	600-100[7]	600-100[7]	See Footnote 10	See Footnote 10
Machine Cycle Time (Nsec)	56	32.5	28.5	Not Available	25	50	50	Not Available	Not Available
Channels (Minimum-Maximum)	12-16	16	12-16	56	12-24	12-104	12-104	56-224	56-224
Price/Channel	320,000 (4 channels)		150,000 (4 channels)	Not Available	85,680 (12 Channels and 4 Peripheral Processors)	54,075 (4 Channels or 1 Block Multiplexer)	54,075 (4 Channels or 1 Block Multiplexer)	Not Available	Not Available
Memory Buffer	64K	32K	32K	24K[3]	See Footnote 5	96K	96K	4 Buffers Of 2K Each	5 Buffers Of 2K Each

CW Chart

1. IBM maintenance is minimum monthly charge, 10 hour/day, 6 day/week. Amdahl and Burroughs rates cover 24 hour/day, 7 day/week.
2. Access time is 50 nsec/byte.
3. Consists of 24K program buffer plus data buffer and storage and central word register.
4. Effectively 60 nsec.
5. Scheduling arrangement for peripheral processor units and CPU to access main memory. Buffer could be one to 12 of CDC's 60-bit words.
6. Univac prices include software.
7. Speed is 600 nsec for 18 bytes in "rear memory" and 100 nsec from "forward memory" to CPU.
8. To achieve advertised performance levels close to Amdahl 470V/7, the 1100/84 should have 8M bytes of memory, bringing memory buffer to 128K.
8. HIS expects to offer other systems in this range based on Level 68 with Gcos operating system; the 68 DPS units have Multics operating system. The 68/80 is what HIS would have bid prior to October 1877; the 68/DPS is the firm's current offering.
10. Memory access time is 750 nsec.
11. Depends on type of work being done.

Hopper: Faster CPUs Not Way of the Future

By Frank Vaughan
CW Staff

SAN DIEGO — Increased computing power will not be found in ever faster CPUs because CPUs cannot continue to get faster — technology will eventually run up against the laws of physics that "Mr. Einstein so graciously provided for us."

That was the word last week from Capt. Grace M. Hopper, special advisor in the Naval Data Automation Command, as she keynoted the OCR Users Association (OCRUA) Winter Conference here. Hopper said users may have to look to the past to find the answers for the future.

In 1944, the Mark I could perform an addition in 333 msec; by 1951, the Univac could do the same thing in 282 microsec. In 1964 the Control Data Corp. 6400 could perform an addition in 300 nsec, and it will not be too long before a CPU can perform the addition in 300 picosec.

But that is not where the answer to large-scale computing needs is going to be found, Hopper said. "We should [look to] our common sense, but as far as I can see, that is the last thing that we ever use in the computer industry," she said.

Common sense "doesn't have any exponents, it has no subscripts, no interval signs, no summations; it doesn't look learned at all," she noted.

"We should look at our early history. Our forefathers didn't have any huge tractors and heavy trucks to move things around; they used oxen. So if they had a great big log down on the ground and one ox couldn't budge it, they didn't try to grow a bigger ox.

CW at OCRUA

"They didn't write out an order for an elephant or a dinosaur — they used two oxen," she pointed out.

Greater computing power in the future is "not going to be a question of getting a bigger computer, it will be a case of getting another computer," she added.

Changing Worlds

"We are going to have to move from the world of computer systems to the world of systems of computers. This has already started to happen and it will increase over time," Hopper said.

What this is going to mean, she added, is that "more than ever before the whole flow of information through a system is going to be the primary thing with which we must be concerned. We are going to need a lot more good systems analysts, people who can look at the information we are processing, find the node and decide what computer power or what facilities are required where, to manage that flow of information.

"As you represent one of the senses to that flow of information, more importantly than ever, you are going to have to be more aware not only of what information you are reading, but also where it is going next and who is going to process it and what you are going to do with it," she told the attendees.

"We are going to be faced with tremendous differences in the cost of doing things. As fast as the cost of computer power has gone down, line costs have gone up. This is another reason for pushing some of the processing out to the source of the information," she pointed out.

"You are going to have to check and validate the information at the source, not after you send it a couple of hundred miles to a CPU. You are going to have to have more powerful tentacles or senses to check information when it happens, rather than a couple of hours later — when it takes forever to go back and get it corrected," she said.

The advent of the microcomputer, with its very low cost and its ability to control fairly large amounts of storage, is going to cause a tremendous number of people to change their minds, she said. A 64K microcomputer is "a darn powerful little computer," she added.

"Every once in a while 'they' tell me, 'You can't do that on a microcomputer.' I have to remind them that we did it on Univac II, which only had 24K.

"They have forgotten what you can do with a dedicated computer. They have forgotten what dedication will do for security.

"We have forgotten a great many things we once knew," she said. "However, there are a few major forces driving us toward the use of mini- and microcomputers. One of them is the tremendous need for speed of processing. That's because of the increased demand for data processing.

"The second great need is that we cannot live any longer with computers that go down. We must have reliability in our systems," she said.

Lodestar™ tape cartridge drive.
The 11.5 megabyte superstar.

Reliable, compact storage on a 3M type cartridge makes Lodestar an attractive alternative to floppys and even reel-to-reel tape transports. It's a superstar for file save and restore, program load, archival storage, data logging and similar applications.

Proven 4 track serial mode MFM recording technology gives you 6400 bpi data densities with a transfer rate of 25k bytes per second and 30 ips read/write. Search and rewind rate is 90 ips.

Interface is easy. Our formatter is compatible with standard 9 track PE controllers.

Lodestar. Simple, compact, reliable storage. Built and backed by Microdata.

Contact one of our local sales offices or the Director of Peripheral Sales, Microdata Corporation, 17481 Red Hill Avenue, P.O. Box 19501, Irvine, CA 92713. Telephone: 714/540-6730. TWX: 910-595-1764.

Microdata OEM Peripherals
A significant difference.

SALES OFFICES:
Anaheim, CA: 714/533-8035 • Atlanta, GA: 404/252-9700 • Bellevue, WA: 206/455-0152
Dallas, TX: 214/387-3073 • San Francisco, CA: 415/573-7461 • Scarsdale, NY: 914/472-1141
Schiller Park, IL: 312/671-5212 • Tampa, FL: 813/872-1557 • Washington, DC: 703/620-3995

Bell Seeking End to LEAA

(Continued from Page 1)

a Nov. 21 memo he sent to President Carter.

Further, no more funds would go to the 460 regional planning boards now in existence.

According to the Attorney General's plan, the institute would continue LEAA's two main functions: conducting crime research and administering federal aid for state and local law enforcement. Bell expects the reorganization to provide tighter controls and to reduce paperwork, however.

The eight-year-old LEAA dispenses more than $600 million annually in crime control funds. This funding level, which is set by Congress, was not addressed in the memo to Carter.

"The critical element to watch in this reorganization is the proposed budget for LEAA programs when and if they are placed under the institute," Diegelman said.

No one will see these funding requests for a while because they would be made in fiscal year 1980 budget development. "We're just submitting the fiscal year 1979 budget to Congress now," he noted.

The LEAA official also pointed out that Bell's proposal has gone no further than the President and will have to receive congressional attention before any action is taken. Diegelman expects the LEAA reorganization plan to go to the House and Senate in midyear.

Matching Requirement

Under Bell's proposal, which questioned the value of many LEAA programs, federal funds for administrative costs incurred by states and local governments would be more restricted. In addition, every dollar of federal funds spent on planning and administration would have to be matched by a dollar of state and local funds.

For some states and localities, such a matching requirement might create problems. Florida, for example, will receive $2 million in planning and administrative funds alone from LEAA this year. Illinois will garner $2.6 million and Indiana will get $1.3 million in federal planning monies during the year.

"When faced with matching amounts of this size, states may decide to decrease their information systems support," Diegelmán said, "but that would be a state decision."

Included in the National Institute of Justice would be a justice research and development institute, a bureau of justice statistics and offices of community anticrime, juvenile justice and state and local assistance, the Attorney General said.

Bell said he will prepare a draft bill for submission to Congress, to the President and to the Office of Management and Budget by mid-January.

J.J. Wasserman Dead at 45

WEST ORANGE, N.J. — One of the leaders in the field of computer security and auditing, Joseph J. Wasserman, died of a heart attack at his home here last week.

Wasserman, 45, was president of Joseph J. Wasserman Associates, which specialized in computer security, audit and fraud detection. He was the developer of the Computer Audit and Retrieval System (Cars), a widely used audit package.

Prior to founding Joseph J. Wasserman Associates, Wasserman was president of Computer Audit Systems, Inc., which he founded in 1969. He was also active in the Institute of Internal Auditors, having served as president of the Southern New England chapter, and was a certified internal auditor.

Wasserman graduated from Bryant College and served in the U.S. Navy. He is survived by his wife, Adrian, and two daughters.

Opponents Use Data for Game Plans

Service 'Psychs Out' Gridiron Teams' Strategies

By Tim Scannell
CW Staff

LOS ANGELES — A number of professional and college football teams around the country are using the services of a large-scale mainframe, based here, to plan strategies for upcoming games.

Apex Data uses an IBM 370/158 to tabulate information gleaned from a team's game films and construct a "tendency" report. This report is given to the team's coach, who uses the information to formulate his game plan based upon the opposing team's strengths and weaknesses.

Detailed information of everything that occurred during the past three games played by a future opponent, both offensively and defensively, is taken from the films and recorded onto "take-off" sheets, a spokesman explained. This information includes downs and distances, formations, plays, results, penalties, fumbles, interceptions, pass covetages, red dogs and blitzes.

These "take-off" sheets are then passed on to Apex, which offers over 200 programs, each one giving a different perspecive of the information submitted. If a particular coach requests plays by down and distance, the printout from this program reveals what the opponent would do from that standpoint in all game situations, the spokesman stated.

Although some of the teams rely on the computer charts completely, most Apex clients supplement them by carefully viewing game films and constructing their own charts and figures, according to Bruce Gagnier, programming manager with Apex.

"One team, at one point in time, would take a selective amount of reports and still do the reports by hand, using the computer printouts to countercheck what they have come out with," he said.

The IBM system used by Apex also doubles as a switching network, receiving information from terminals located in various cities. "We have one team right now that actually has a system in its office. It transmits data into our computer and then selectively picks the reports it wants, so we don't have any interference with it whatsoever," Gagnier said.

Because data related to an upcoming game is privileged information and its release could handicap a team's efforts, security precautions are taken, he added.

"If a team is discovered to be very concerned with the rushing gain, the other team might decide to alter its game plan. Security, therefore, is based on not sending out a whole set of reports and not revealing what type of report the other team might be ordering," he explained.

"There's also no way the data, when it's coded up for one team, can be understood by another," he continued. "Whereas one team might call a play a 'front,' another team might call it an 'under-or-over,' " he pointed out.

No Room on the Bench

While a computer is used for its speed in analyzing plays and determining a team's tendencies, Gagnier doesn't see the day when a terminal will occupy a seat on the bench.

"I doubt very seriously if you would ever get any on-line terminals on the sidelines ... that's an impossibility," he said.

But computers definitely do have a place in football, according to Ed Alsman, assistant coach for the San Francisco 49ers.

"There's not as much difference as you might think from club to club — they're all good football players," he said. "The real difference between winning and losing is the little things, getting the edge, and that's what the computer does for a football team."

Presently, Apex is under contract to 17 professional teams, including the Detroit Lions, Los Angeles Rams and New England Patriots and five college football teams.

'It's Getting So We'll Be Having Yearly Models Coming Out Like the Auto Companies.'

Vendors

THE SOUTHEAST
DIRECTORY OF COMPUTER
INSTALLATIONS

FDR-DSF
2000 USERS

Fast Dump Restore
- Dump/Restore Full Volumes
- Diagnostic Processing

Data Set Functions
- Dump/Restore up to 250 Individual Data Sets
- Restore Data Sets from FDR Full Volume Backups

Volume and Data Set Level Password Protection
Performance — Reliability
Supporting
2314 • 3330-1 • 3330-11
3340-35 • 3340-70 • 3344 • 3350

1974 datapro HONOR ROLL
1976 MEMBER datapro SOFTWARE HONOR ROLL
1975 datapro HONOR ROLL

For further information or Free 30-day Trial,
call or write to:

INNOVATION
DATA PROCESSING
970 Clifton Avenue, Clifton, NJ 07013 • (201) 777-1940

Acpa Criticizes ACM's Break With Soviets

KENSINGTON, Md. — The Association for Computing Machinery (ACM) erred in cutting ties with the Soviet Union to protest persecution of dissidents there, according to another professional society.

The Association of Computer Programmers and Analysts (Acpa) believes that severing relations "deprives those very citizens who are most oppressed of that vital link to outside information and communications," according to a recent Acpa policy statement.

Exchange to Continue

While agreeing with the ACM that the Soviets' "almost total disregard for the basic human rights of its citizens is deplorable," Acpa intends to "continue whatever semblance of professional and intellectual exchange of ideas ... is possible" while continuing "an open attack on every form of subordination of human rights practiced by that government," Acpa Chairman Robert L. White said.

White asserted that "Soviet lives and technology are too valuable to the rest of the world for us to ignore their existence. If the door to free communications is closed, Acpa wants it done by the guilty country."

The ACM sent a letter to Soviet Academy of Sciences President A.P. Aleksandrov announcing its cut-off intentions [CW, Dec. 12].

Intervention Sought

The letter stated that the ACM "will not cooperate with or cosponsor meetings in your country until the climate of intellectual freedom clearly improves" and asked Aleksandrov to personally intervene on Sharansky's behalf.

The ACM has also asked each of its 35,000 members to weigh the situation of Sharansky and others like him in deciding whether to visit the Soviet Union or publish in Soviet journals.

Sharansky was jailed on March 15 for alleged treason and involvement with the Central Intelligence Agency. He has been held since then without being formally charged.

Other computing professionals have joined the protest, including attendees at last fall's Fifth International Joint Conference on Artificial Intelligence.

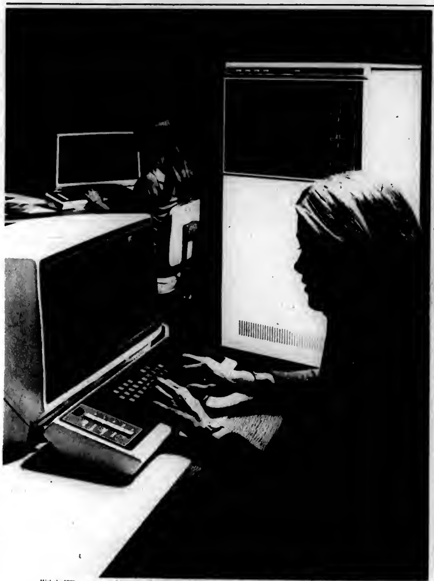
DP Architecture To Be Subject Of Annual Prize

NEW YORK — An annual award for "contributions to computer and digital systems architecture" will be jointly given by the Association for Computing Machinery (ACM) and the Institute for Electrical and Electronics Engineers (IEEE) Computer Society.

The award, consisting of a certificate and $1,000 in cash, will be called the Eckert-Mauchly Award in honor of Univac I developers J. Presper Eckert and John W. Mauchly, the ACM said.

Nominations for the Eckert-Mauchly Award will be solicited each year in the monthly *Communications of the ACM* and the *IEEE Computer* magazines.

The award will be presented at the Annual Symposium on Computer Architecture, which is cosponsored by the ACM Special Interest Group on Computer Architecture (Sigca) and the IEEE Computer Society Technical Committee on Computer Architecture, the ACM said, adding that contributions for which the award is granted can take any form that demonstrates and propagates computer architecture concepts.



INFOREX: THE SIMPLEST SOLUTION TO ALL YOUR DATA ENTRY PROBLEMS.

The simplest and best solution to all your data entry problems is right here: the Inforex data entry family.

Simplest because we design them for ease of use and speed of throughput.

Best because we've been a leader in the innovation and development of key-to-disc data entry products and capabilities right from the start.

Which is why our family's got it all. From the basic keypunch replacement 1300 IKE System to the tremendously powerful maxi-editing System 3300.

So whatever your needs — modest, middling, or immense — the growing Inforex data entry family will meet them.

You don't have to settle for a compromise system. You don't have to sweat out an unsatisfactory price/performance choice. All you have to do is choose the system that's best for you.

And that's where an Inforex Support Team comes in. They'll help you select just what you need. They'll provide expert installation. And they'll give you the benefit of their years of experience in other installations.

But even after all that, you won't be left high and dry. Whenever and wherever you need help, an Inforex Support Team will be available with the support you need.

The Inforex data entry family. You shouldn't settle for anything less.

With the 1330, you can consolidate remote job entry and batch data entry applications without compromising either function. The system features expandable disc storage (up to four — 10 Mb. drives) foreground and background editing and bisync communications.

Inforex 1300 and 1301 offer highly cost effective data entry capability for smaller installations (4 to 8 keystations) or remote locations where you can take advantage of our communications capabilities.

The 1303 provides medium range data entry capacity, with about triple the disc capacity of the 1301. It supports up to 16 keystations and the addition of edits, table look-ups, range checks and cross-footing. The 1303 also offers communications capabilities such as *spooling, HASP* and *RJE*.

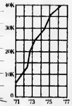
The Inforex 3300 is a powerful pre-processing system that allows you to edit data at the point of entry, enabling you to offload your mainframe. Its sophisticated editing capabilities can also handle many of those applications which you haven't had time to put on your present mainframe.

I would like more information on the following:
☐ Key-to-disc data entry ☐ Distributed processing
☐ Computerized records management
☐ I would like to talk with an Inforex Sales Representative

Name
Title
Organization

Address

City
State Zip
Telephone



More keystations in more countries than any other company in the world.

CW-1

Offices in major cities throughout the United States, Canada and Europe. Distributors worldwide.

INFOREX

Inforex, Inc., Dept. 321, 21 North Avenue, Burlington, Mass. 01803

CalComp. Zeta.

Compare.

Zeta Research
[illegible]00 Stanwell Dr. Concord, CA 94520
(415) 671-0600
A Division of Nicolet Instrument Corporation

The world's best DBMS announces the end of the chain-pointer generation.

Adabas has broken the chain-pointer barrier. For the first time in history, an inverted list DBMS is No.1 in both throughput/efficiency and ease of use.

For years, others have said you could have *either* throughput *or* ease of use. Adabas has always said you can have *both*.

Datapro '77, conducted with *Datamation,* is the latest in a long series of surveys that proves our point. The user community also gave us the highest average rating for all categories. Who could ask for anything more?

Every day, more people realize that the rigid hierarchical structures of the past are giving way to the relational approach of tomorrow.

The trend is clear. The future is here. It's Adabas.

Combined with Com-plete, Software ag's teleprocessing system, Adabas is the most powerful DB/DC system available anywhere.

Seeing is believing.

We've just made a lot of claims, and we want to prove them. That's why we'd like to give you a free presentation at your convenience. Simply call us, or return the coupon below.

software ag
OF NORTH AMERICA, INC.
Reston International Center 11800 Sunrise Valley Drive
Reston, Virginia 22091. Phone (703) 860-5050

1977 datapro HONOR ROLL

1. ☐ I'd like more information on Adabas.
2. ☐ Please send more information on Com-plete.
3. ☐ Please call to arrange a free presentation.

Name____________ Company name____________
Street____________ City____________
State______ Zip______ Phone____________
Type of computer____________ Operating system____________

Available Worldwide

Member SIA Software Industry Association

Tennessee Tax Applies to In-House Software

By Molly Upton
CW Staff

NASHVILLE, Tenn. — Software developed by a firm's DP department for its own use, like software that is sold, is subject to this state's new sales and use tax, according to a spokesman for the Tennessee Department of Revenue.

Recent legislation which specifically defines software as tangible personal property and therefore subject to the tax [CW, May 2, 1977] applies to both types of software, he said.

The legislation, promoted by the governor, was designed to circumvent a decision by the Tennessee Supreme Court in Commerce Union Bank vs. Tidwell that decreed computer software intangible and therefore not subject to the state sales and use tax [CW, Aug. 30, 1976].

In its interpretation of the law, the state is drawing a parallel between in-house program development and the in-house construction of manufacturing machinery, according to Donald W. Jackson, executive vice-president of the Tennessee Taxpayers Association.

The law states: "'Tangible personal property' means and includes personal property, which may be seen, weighed, measured, felt or touched, or is in any other manner perceptible to the senses. It specifically includes customized computer software, which is defined as information and directions loaded into a computer which dictate different functions to be performed by the computer, whether contained on tapes, disks, cards or other device or material."

Jackson explained he had been under the impression that the legislation would apply only to purchased software that was customized or packaged by a company specializing in the sale of such software.

But officials in the Department of Revenue informed him the use tax will apply to computer programs developed by employees of the company that uses the software, he said.

The state's position is that the legislation applies to banks, manufacturers and other users who may have in-house staff developing software, Jackson said.

In making this interpretation, the Sales Tax Division cited another section of the Sales Tax Act, TCA 3004:

"Where a manufacturer, producer, compounder or contractor erects or applies tangible personal property, which he has manufactured, produced or compounded or severed from the earth, such person so using the tangible personal property shall pay the tax herein levied on the fair market value of such tangible personal property when used ...."

In deciding how to assess the use tax, the state asks users to calculate the number of programmer hours involved in production of the program, their salary and fringe expenses, as well as overhead costs, Jackson indicated.

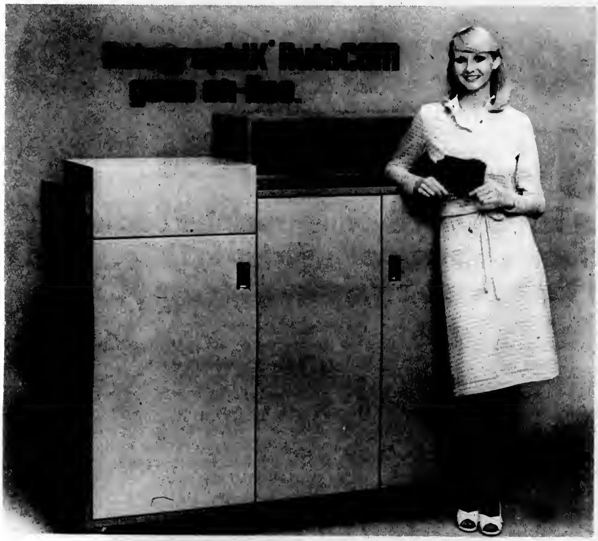
The Tennessee Taxpayers Association plans to fight this new legislation, he said.

NYU to Present DP Job Seminar

NEW YORK — A three-hour seminar on career opportunities in the field of DP will be offered to the public free of charge here on Jan. 19 from 6-9 p.m.

Presented by New York University's School of Continuing Education, the course will cover current trends in DP that have created new employment possibilities.

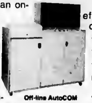
For further information, call (212) 598-2105.



Now you can wind up with microfiche and never unwind a reel of tape.

The simplicity and convenience of AutoCOM™ made on-line recording a natural. So we developed an on-line version to interface directly to the central processing unit of virtually any IBM 360/370 computer. That means you never have to bother with tape loading or rewind time.

Right on queue, on-line AutoCOM delivers cut, dry microfiche ready for immediate viewing. That means computer output can be checked without waiting.

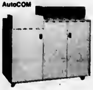

Off-line AutoCOM

You get better efficiency because there is a full-page 16,000 - byte buffer system. This decreases channel connect and contention time.

A built-in test simulator contains its own diagnostics so there's no need to interrupt the CPU for maintenance. And on-line AutoCOM is simple enough to be delivered, installed and operational in one day.

MiniAutoCOM

The AutoCOM product line includes models for every COM application. Standard off-line AutoCOM. MiniAutoCOM™. And now on-line AutoCOM, the system that lets you wind up with microfiche without ever unwinding a reel of tape.

The new on-line AutoCOM


DatagraphiX® is a registered trademark of DatagraphiX Inc

a General Dynamics subsidiary

DatagraphiX, Inc.; P.O. Box 82449; San Diego, CA 92138, (714) 291-9960

CalComp.
Zeta.
In a Class
by
Themselves.

Zeta Research
2300 Stanwell Dr. Concord, CA 94520
(415) 671-0600

Upholds Lower Court Decision

Alabama High Court: Software Not Taxable

By Molly Upton
CW Staff

BIRMINGHAM, Ala. — The Supreme Court of Alabama has upheld a lower court ruling that software is intangible and therefore not subject to use tax.

In 5-3 decision, the State Supreme Court upheld the Court of Civil Appeals' ruling that Central Computer Services, Inc. does not have to pay $13,519.91 in state use tax for eight programs obtained from University Computing Co.

The Supreme Court's decision in Alabama vs. Central Computer Services, Inc. cited two earlier cases: Boswell vs. Paramount Television Sales, Inc. and Commerce Union Bank vs. Tidwell.

In Boswell, the tax question concerned leasing movie films. There the presiding court found the right to publish or broadcast motion picture film was physically inseparable from the movie film itself, and therefore film was tangible personal property.

In Tidwell, the Tennessee Supreme Court ruled computer software purchased by the bank was not tangible personal property subject to that state's use tax because the knowledge contained on the tapes was what was purchased, not the media on which it was stored.

The Alabama court drew a distinction between movie film and software, ruling magnetic tapes and punched cards are distinguishable from movie films because the "physical presence of magnetic tapes and punched cards is not essential to the transmittal of the desired information from its creator at University Computing Co. to Central Computing Services."

The information could be transmitted via telephone or "brought into Alabama in the mind of an employee of University Computing Co.," the court added.

It thus concluded: "We find in the present case that there is an incidental physical commingling of the intangible information sought by Central Computer Services and the tangible magnetic tapes and punched cards themselves. We therefore hold that the essence of this transaction was the purchase of nontaxable intangible information."

Dissenting Opinion

The dissenting opinion admitted other courts have ruled that software is intangible, but indicated it could not distinguish between the Paramount movie case and software.

Content of the films also could be transmitted into the state or brought in via actors and actresses, the dissenting opinion observed.

Programs are tangible property and can be the subject of theft, the dissenters said, citing the case of Hancock vs. Decker. In that 1955 case, Robert F. Hancock was convicted of grand larceny for photocopying programs belonging to Texas Instruments and attempting to sell them to Texaco for $5 million, according to *Computer Law and Tax Report*.

The court held the program should be valued at more than the $35 cost of the paper on which the programs were written.

Alabama Ruling Cited as Threat To Tax Credits

BOSTON — Once a company has successfully proven in the state courts that software is intangible, as Central Computer Services, Inc. did in Alabama, it will have "considerable difficulty" persuading the federal government that the same software is tangible and qualifies for investment tax credit, according to a copyrighted article in "Computer Law and Tax Report."

Today the investment tax credit is 10% of the purchase price and constitutes a valuable benefit to the user. This tax credit could be substantially increased by the Carter Administration, Robert Bigelow wrote in the December 1977 issue of the newsletter.

The effort to avoid sales, use and property tax laws on software by having it declared intangible will not have a long-lasting effect, Bigelow also warned. While such efforts may help the user by preventing the imposition

(Continued on Page 14)

DATA ENTRY
PROBLEM SOLVER

World's leading authorities present—Keys to successful Data Entry operations. New 275 page Manager's "How To" guide—"DATA ENTRY PROBLEM SOLVER"—Tells how to

INCREASE KEYSTROKING RATES
SELECT SUCCESSFUL OPERATORS
DECREASE COSTS AND COMPLAINTS
STOP CONTINUAL ABSENTEEISM
REDUCE OPERATOR TURNOVER
BUILD DEPARTMENT MORALE
SUPERVISE WITHOUT PROBLEMS

FREE DETAILS
DATA ENTRY DIGEST
10522 Ridgeway Dr., Santa Ana,
Calif. 92705, (714) 838-2060

EDP books you can't afford to be without

any two of these great professional books for only $2.95 values up to $68.50

THE INFORMATION SYSTEMS HANDBOOK
by F. W. McFarlan & R. L. Nolen
769/29X Pub. Pr., $35.00 Club Pr., $25.50

DATA PROCESSING MANAGEMENT
Methods and Standards
by D. H. Brandon, A. D. Palley and A. M. O'Reilly
767/203 Pub. Pr., $29.95 Club Pr., $21.50

MINICOMPUTER SYSTEMS
Structure, Implementation, and Applications
by C. Weitzman
766/770 Pub. Pr., $19.50 Club Pr., $14.50

AUTOMATIC DATA PROCESSING HANDBOOK
Edited by The Diebold Group, Inc.
168/075 Pub. Pr., $33.50 Club Pr., $23.75

TOP-DOWN STRUCTURED PROGRAMMING TECHNIQUES
by C. L. McGowan & J. R. Kelly
769/052 Pub. Pr., $16.95 Club Pr., $13.50

HIGH LEVEL COBOL PROGRAMMING
by G. W. Weinberg, S. E. Wright, R. Kauffman and M. Goetz
768/595 Pub. Pr., $17.95 Club Pr., $14.95

THE DESIGN OF THE MANAGEMENT INFORMATION, 2/E
by D. Q. Matthews
768/862 Pub. Pr., $12.95 Club Pr., $10.95

MINICOMPUTER SYSTEMS
Organization and Programming (PDP-11)
by R. H. Eckhouse, Jr.
768/641 Pub. Pr., $18.95 Club Pr., $13.95

DATABASE PROCESSING
Fundamentals, Modeling, Applications
by D. M. Kroenke
769/931 Pub. Pr., $16.95 Club Pr., $12.95

BASICS OF DATA COMMUNICATIONS
Edited by H. R. Karp
191/59X Pub. Pr., $19.50 Club Pr., $16.95

CHARGING FOR COMPUTER SERVICES
Principles and Guidelines
by D. Bernard, J. C. Emery, R. L. Nolan and R. H. Scott
771/863 Pub. Pr., $10.00 Club Pr., $6.50

A DISCIPLINE OF PROGRAMMING
by E. W. Dijkstra
770/116 Pub. Pr., $17.50 Club Pr., $14.50

DATA BASE DESIGN
by G. Wiederhold
701/30X Pub. Pr., $21.50 Club Pr., $15.95

MICROPROGRAMMING PRIMER
by H. Katzan, Jr.
333/674 Pub. Pr., $17.95 Club Pr., $13.95

REAL TIME SYSTEMS
Management and Design
by D. Tebbe and G. Collins
644/826 Pub. Pr., $13.95 Club Pr., $11.75

SOFTWARE RELIABILITY
Principles & Practices
by G. J. Myers
769/885 Pub. Pr., $19.95 Club Pr., $16.75

Introductory offer to new members of the
Computer Professionals' Book Club

Two special bonus books come to you for $2.95 with your first club selection

THIS new professional club is designed to meet your day-to-day on-the-job needs by providing practical books in your field on a regular basis at *below publisher prices*. If you're missing out on important technical literature—if today's high cost of reading curbs the growth of your library—here's the solution to your problem.

The Computer Professionals' Book Club was organized for you, to provide an economical reading program that cannot fail to be of value. Administered by the McGraw-Hill Book Company, all books are chosen by qualified editors and consultants. Their understanding of the standards and values of the literature in your field guarantees the appropriateness of the selections.

How the Club operates: Every month you receive free of charge *The Computer Professionals' Book Club Bulletin*. This announces and describes the Club's featured book of the month as well as alternate selections available at special members' prices. If you want to examine the Club's feature of the month, you do nothing. If you prefer one of the alternate selections—or if you want no book at all—you notify the club by returning the card enclosed with each *Bulletin*.

As a Club Member, you agree only to the purchase of four books (including your first selection) over a two-year period. Considering the many books published annually, there will surely be at least four you would want to own anyway. By joining the club, you save both money and the trouble of searching for the best books.

VALUES UP TO $30.00 WITH MAJOR DISCOUNTS ON ALL OTHER CLUB SELECTIONS. Your bonus books come with the first selection, and you may choose both of them from the books described in this special introductory offer.

EXTRA SAVINGS: Remit in full with your order, plus any local and state tax, and McGraw-Hill will pay all regular postage and handling charges.

NO RISK GUARANTEE:
If not completely satisfied return selections for full refund and membership cancellation.

MAIL THIS COUPON TODAY

COMPUTER PROFESSIONALS/Book Club P.O. Box 582 Princeton Road, Hightstown, New Jersey 08520

Please enroll me as a member and send me the three books indicated. I am to receive the two bonus books at the introductory price of $2.95 plus my first selection, plus tax, postage, and handling. If not completely satisfied, I may return the books within 10 days and request that my membership be cancelled. If I keep the books, I agree to take a minimum of three additional books during the next two years at special Club prices (guaranteed 15% discount, often more). I will receive the Club Bulletin 13 times a year. If I want to examine the featured selection, I need take no action. It will be shipped automatically. If, however, I want an alternate selection—or no book at all—I simply notify the Club by returning the convenient card always enclosed. I will always have a minimum of 10 days in which to return the card and you will credit my account fully, including postage, if this is not the case. Membership in the club is continuous but cancellable by me at any time after the four-book purchase requirement has been filled. *This order subject to acceptance by McGraw-Hill. Orders from outside the continental U.S. must be prepaid. Company, business, or institutional tax exemption status is not applicable to purchases made through individual Club memberships. All prices subject to change without notice. Offer good for new member only.*

Write Code # of 1st bonus book selection here ☐
Write Code # of 2nd bonus book selection here ☐
Write Code # of 1st book selection here ☐

NAME ______
ADDRESS ______
CITY ______
STATE ______ ZIP ______

P39293

Something Fishy in Japan

By Tim Scannell
CW Staff

TOKYO — The Japanese have initiated a project involving computer-controlled fish farms that is expected to produce 400,000 to 500,000 tons of fish per year.

Under the plan, an extension of the limited fish farms already operational in Japan, scientists will attempt to increase production by controlling and monitoring each stage of fish development, according to Dr. Akira Suda, an official at the Japanese Fishery Agency's Research Department.

Such factors as environment and the fish's growth rate will be input to the computer which will, in turn, track the entire life cycle, Suda explained.

The program was initiated because newly established 200-mile offshore limit laws have eliminated many of Japan's worldwide fishing grounds. Japan will lose approximately 600,000 tons of fish per year as a result of the recently implemented laws, a spokesman said.

The fish will be produced by artificially hatching the spawn and feeding them artificial nutrients to accelerate their growth rate, the spokesman said.

Alabama Software Ruling Seen Threat to Tax Credits

(Continued from Page 13)

of taxes for past years, "it seems likely the future will find software subject to these taxes" through legislative action, he added.

The Internal Revenue Service has consistently taken the position that software programs are intangible and don't qualify for investment tax credit, Bigelow said, but noted there have been court cases that have found differently.

A number of years ago, Robert F. Hancock was convicted of grand larceny when he photocopied 59 computer programs belonging to Texas Instruments, Inc. and attempted to sell them to Texaco for $5 million. Hancock argued he stole only $35 worth of paper because the programs were not tangible property, but the court held that the programs should be valued at more than the cost of their media.

Bigelow also predicted that efforts to avoid property, sales and use taxes by defining software as intangible could have other ramifications.

If, for example, software is defined as "an intellectual creation residing within an electronic computer represented in patterns of electrical or magnetic bits of information that, when logically executed within the circuitry of the machine, cause the hardware to perform specific predetermined functions," awarding of patents could be affected.

"Patents are available for inventions of apparatus or processes; the proposed definition would not seem to suggest either of these," he said. "Under the new copyright act, effective in January, a work of authorship must be 'fixed in a tangible medium of expression;' it is not clear that the intellectual creation represented by patterns and bits will fit this defintion."

"Computer Law and Tax Report" is published monthly by Warren, Gorham & Lamont, Inc., 210 South St., Boston, Mass. 02111.

Take an in-depth look at in-house timesharing:

You know the problems facing the data processing department:

Other departments in your company want faster response, broader capabilities, better service.

And your management wants you to hold down your operating costs.

You're probably looking hard for a solution. A closer look at in-house timesharing could give it to you.

Fast, long-lasting relief
Unlike upgrading a large central computer, expansion to an in-house timesharing system isn't a time-and-money-consuming ordeal.

And unlike buying outside computer time, you're not building in a monthly bill that inevitably keeps building up.

Adding an in-house timesharing capability is a shrewd way to add computer power. Because it won't add significantly to your operating costs; in fact, it can pay for itself by reducing current costs.

Especially if you add the system specifically built for timesharing: our BTI 4000.

A timesharer's timesharer
The BTI 4000 Interactive Timesharing System is made by us:

Basic Timesharing, Inc. We're the computer manufacturer with timeshare experience. Which has helped us produce a computer uniquely right for timesharing.

To help you do more—while helping your company spend less.

Easy to begin, room to grow
You can own your own BTI 4000 for as little as $35,950. For that you get a ready-to-go system with 10 megabytes of storage and 8 ports—just add terminals.

And start-up won't cause a departmental hang-up. The BTI 4000 can be installed and working for you in one working day.

Expanding to do even more work takes even less work. The BTI 4000 features modular construction, so system downtime for expansion is minutes, rather than days. You can add disk storage to 400 megabytes; increase user capacity to 32 ports; add peripherals like industry-compatible magnetic tape and a line printer.

Hard working, always working
The BTI 4000 is a true timesharing system. It allows doing any mix of tasks, all at the same time, all completely independent.

It also gives you continuous system availability, because software housekeeping can be performed while users are on-line.

There's also off-hours job-stream processing. So the BTI 4000 can be working for you, even when no one's around.

The BTI 4000 uses BASIC-X, an unusually powerful extension of the BASIC user language, enhanced for business programming.

What's more, the BTI 4000 offers heirarchal account organization and stringent security so that you can maintain total control over who's using it, and what they can do.

And it does all this without a full-time operator.

Inexpensive help
Used during typical office hours, the operating costs for a BTI 4000, including maintenance, are about $1 per terminal hour. And should you grow to 24 hour usage, your operating costs shrink to less than 10¢ per terminal hour.

Around-the-clock help
We back our BTI 4000 with any-hour, anywhere, on-line support with dial-up access for problem diagnosis. Yet in a typical installation, our maintenance plan costs less than 1% of the system's purchase price per month.

Look to us
The BTI 4000. The interactive timesharing system that will help your data processing department do more, for less.

For more information, just look to the Basic Timesharing office nearest you.

The BTI 4000 Means Business.

'Burster? I Thought You Said Shredder!'

CalComp.
Zeta.
The Greatest Names in Plotting.

Zeta Research
[illegible] Stanwell Dr. Concord CA 945[illegible]
(415) 671-0600
[illegible]

Calendar

Feb. 9, Baltimore, Md. — **Third Annual Data Processing** Day, with vendor exhibits and seminars, sponsored by the local Data Processing Management Association Chapter. Contact: M. Stanley Baker, Commercial Credit Corp., 300 St. Paul Place, Baltimore, Md. 21202.

Feb. 14-16, Orlando, Fla. — **Second International Learning Technology Congress & Exposition on Applied Learning Technology**. Contact: Dr. Carl R. Vest, Society for Applied Learning Technology, 41 Culpepper St., Warrenton, Va. 22186.

Feb. 14-16, London — **All Electronic Show.** Contact: British Information Services, 845 Third Ave., New York, N.Y. 10022.

Feb. 15-17, San Francisco — **ISSCC 78** sponsored by the Institute of Electrical and Electronics Engineers (IEEE). Contact: IEEE, 345 E. 47th St., New York, N.Y. 10017.

Feb. 15-17, Washington, D.C. — **Data Communications: An Introduction to Concepts and Systems.** Contact: Don Welsher, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Feb. 15-17, Chicago — **Effective Computer Operations Management.** Contact: Don Welsher, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Feb. 15-17, Washington, D.C. — **Data Base Management Systems: General Concepts and Planning Guidelines.** Contact: Don Welsher, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Feb. 21-23, Washington, D.C. — **DataComm 78.** Contact: Conference Manager, DataComm 78, 60 Austin St., Newton, Mass. 02160.

Feb. 22-24, San Francisco — **Queueing Systems,** sponsored by Technology Transfer, Inc. Contact: Technology Transfer, Inc. P.O. Box 49765, Los Angeles, Calif. 90049.

Feb. 23, Detroit, Mich. — **Annual Association for Computing Machinery (ACM) Computer Science Conference.** Contact: Seymour J. Wolfson, Wayne State University, Detroit, Mich. 48202.

Feb. 23-24, San Francisco — **Minicomputers and Microcomputers: Selection and Usage Guidelines.** Contact: Don Welsher, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Feb. 27-March 1, Cherry Hill, N.J. — **Data Entry Management and Supervision Seminar.** Contact: Management Information Corp., 140 Barclay Center, Cherry Hill, N.J. 08034.

Feb. 27-Mar. 1, New York — **Data Processing: An Introduction to Concepts and systems.** Contact: Don Welsher, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

The CW Calendar generally appears in the first and second issues of each month, and events are listed a month in advance. All conference announcements should be sent to the CW Editorial Department, 797 Washington St., Newton, Mass. 02160, at least six weeks prior to the month in which the event is slated to occur.

DP Bills Keep Congress Busy

By Edith Holmes
CW Staff

WASHINGTON, D.C. — Congress considered nearly 300 bills related to computers during its 1977 deliberations, according to the American Federation of Information Processing Societies (Afips).

In response to a request from Afips' Washington office for data on DP-related legislation, the House of Representatives Information Systems (HRIS) staff produced a 420-page printout summarizing 328 pertinent bills and resolutions before the House and Senate at the end of October.

While some of these proposed laws dealt with manual information systems, 80%, or 273 bills and resolutions, were related to automatic data processing, Afips said.

More than half of those 273 pieces of legislation — 142 resolutions and bills — involved telecommunications in general and the Consumer Communications Reform Act, or "Bell Bill," in particular, Pender M. McCarter, research associate with the Washington office, noted in the January "Afips Washington Report."

Eighty-six pieces of legislation, or 32% of the 273 bills and resolutions, treated the privacy issue and its effect on recordkeeping by the federal government, hospitals, financial institutions, educational organizations, employers and others, Afips found.

Such data bases as those proposed for medical information patient care systems and a national adoption information exchange system commanded congressional attention in 26 bills, 10% of the DP-related legislation proposed during 1977.

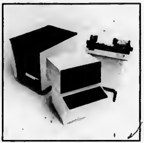
Finally, Afips discovered that seven pieces of legislation dealt with the revision of the Communications Act of 1934, begun by the 95th Congress; four involved electronic funds transfer (EFT) systems; and five concerned such matters as the acquisition of DP equipment by the federal government.

HRIS's survey for Afips included only those pieces of DP legislation brought up before the October cut off date.

General Computer Systems, inc. reports a record year.

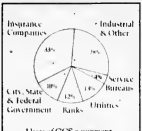
General Computer/Systems, Inc. is pleased to announce the most profitable year in its history. Consolidated gross revenues reflect a 38% increase over 1976. We attribute this increase to several factors.

The introduction of our new 211 Data entry system which is designed on a modular basis to allow the user to start with a small configuration and expand according to his needs.



During this period we also introduced our DataText III - a shared logic word processing system featuring two types of workstations, up to 30,000 pages of storage, and the ability to add various peripherals such as printers, tape drives, and discs. Communications and remote printing capabilities are also available. The ability of GCS to handle Word Processing Center and electronic mail type applications gives us the most "State of the Art" Word Processing system available in today's and tomorrow's marketplace.

In addition General Computer/Systems, Inc. has acquired GCS (UK) which is a wholly-owned subsidiary in England. This has enabled us to expand our marketing goals and service capabilities throughout the common market countries.



Users of GCS equipment

To date our systems are in operation in twenty countries around the world. And we have plans to expand our market to include third world areas such as Central and South America, India and Taiwan.

We would like to take this opportunity to pat ourselves on the back, and to thank our many employees, suppliers and customers for making the past year our most successful.

GCS
general computer systems.

Addison (214) 233-5800 • London 579-9401 • San Francisco (415) 434-0494 • Los Angeles (714) 992-1491 • New York (212) 687-8450 • Hartford (203) 633-0230 • Boston (617) 237-6520 • Pittsburgh (412) 464-4110 • Seattle (206) 822-1737 • Chicago (312) 692-7770 • Topeka (913) 235-6050 • Southfield (313) 569-2220 • Brooklyn Heights (216) 351-7444 • Atlanta (404) 457-3701 • Nashville (615) 242-8218 • Sydney, Australia 439-4155 • Bruxelles, Belgium (02) 479.98.80 • Paris, France 542.79.17 • North Poinr, Hong Kong 5-717231 • Jakarta, Indonesia 5911169 • Torino, Italy 54.50.53 • Tokyo, Japan 584-2351 • Kuala Lumpur, Malaysia 88795 • Manila, Philippines 86-49-51 • Singapore 2211311 • Steinbach, W. Germany (06171) 77 11

Editorial

Keeping the Lines Open

The Association of Computer Programmers and Analysts (Acpa) has announced its disagreement with the Association for Computing Machinery's (ACM) response to persecution of dissident computer scientists in the Soviet Union (See story on Page 10).

The ACM recently cut ties with that country, officially stating that it "will not cooperate with or cosponsor meetings in (the Soviet Union) until the climate of intellectual freedom clearly improves" [CW, Dec. 12]. The association was especially upset over the treatment of computer chess expert Anatole Sharansky, who has been jailed since last March without being formally charged.

Acpa is also outraged by this denial of human rights, but differs with ACM on how to express this and try to effect change for the better. Rather than eliminate them, Acpa has decided to use its ties as a medium of protest, mounting "an open attack on every form of subordination of human rights practiced by that government."

The ACM's action is not without merit; it may prompt other groups to join in the protest, forming a sizable bloc of opinion that the Soviets — since they value their international prestige — might to some extent heed.

In the context of other human rights protests, the ACM action may assist in raising the human rights consciousness of the world community, which might be an added constraint to human rights violations in other countries, if not the Soviet Union.

Yet Acpa's point is well-taken. Since the dawn of civilization, political states have often maintained communication with each other — indirectly if not directly — in times of intrigue and strife (including war) precisely because such communication was seen as the only means of attaining a resolution or at least limiting the extent of harm.

Of course, the ACM's action can be seen as more than simply curtailing communication.

It can be seen as a boycott, denying the Soviets a desired product — American computing expertise — until they shape up.

But such a boycott can only have limited success because there are alternative ways in which the Soviets can learn about the development of American computer technology, many of them simple and hardly surreptitious.

Though well-intentioned, it is likely that the ACM's action will be admired by some as eloquent but do little to stop or limit deprivation of human rights in the Soviet Union.

The difference between the nature of the ACM's and Acpa's constituencies — the former academic, the latter application- and industry-oriented — does have significant bearing on how the Soviets might regard a severance of relations with each.

The Soviets may well be more dependent on the ACM's expertise in research and development than on Acpa's expertise in implementation, though they would seem to have much to learn from both.

Nevertheless, Acpa's approach is more realistic and is the path the ACM should have taken.

Data Past

Five Years Ago
Jan. 17, 1973

GAITHERSBURG, Md. — A National Bureau of Standards draft report on the "Means of Achieving Interchangeability of Computer Peripherals" said that no single interface standard should be developed for all peripheral equipment, but the government should begin working on developing selected standards particularly in the tape and disk area.

— — —

Two large vendors feuded with users over whether those vendors should provide maintenance on systems with independent add-on memory attached. IBM was prohibited by a court in Germany from refusing to service and maintain its 360/30 computers with Itel memory attached, and Xerox Corp. told one of its Sigma CPU users that it would no longer provide maintenance if independent memory were added.

Eight Years Ago
Jan. 21, 1970

ATLANTA — The omission of a single Cobol statement from the card source-deck of a program resulted in issuance of 779 welfare checks totaling $67,000 to persons who were not supposed to receive them. William H. Burson, director of the Georgia State Department of Family and Children Services, said the error occurred in the process of changing from a manual to a computer-assisted check-issuing system.

— — —

DAYTON, Ohio — The National Cash Register Co. announced the "educational services" facet of its recent unbundling, effective Jan. 13, to users of its Century systems. Under the plan, all educational courses were priced separately. Each user, however, would receive a basic educational allowance as part of the rental or purchase price of his system.

'We Break You In Easy — Your Starting Quota Is Only Five Loads a Day.'

Letters to the Editor

Trial Coverage Distorted

For a number of years, I have been sometimes perplexed and sometimes amused by the continuing inaccuracy of Computer*world*'s coverage of the IBM cases. My impression is that your reporters generally report accurately, but your anti-IBM editorial policy (especially evident in your headlines) perverts the reality.

The Dec. 19 issue has three good examples of inaccuracies. First is the editorial entitled "No Sunshine Here." You attacked the "President of the United States," the "Department of Justice," "IBM legal counsel," "businessmen representing alleged monopolizers" and "top officials," all concerning their failure to disclose a settlement proposal which you said IBM counsel made to the Department of Justice "a few weeks ago." Did it occur to you that perhaps no such proposal was made?

Second, you stated "IBM's cross-examination of government witnesses has usually taken at least twice as long as the witnesses' direct questioning . . . " ["IBM Ponders Cutting Witness List in U.S. Case"]. Not true. Total direct examination to Jan. 1 is 19,961 pages and total cross-examination is 21,486 pages.

Third, you announced to the world that a new Cravath attorney representing IBM "is Alan Hruska, whose father, Roman Hruska, served as senator from Nebraska." Alan is my partner and I have known him for more than 20 years. I have known the senator for about 10 years, since I was on the staff of a Presidential commission to study violence of which he was a member. I give you my complete assurance, on behalf of both of them, that they are not related.

I am sure it will do no good to ask, but won't you please make a New Year's resolution to try to be accurate?

Thomas D. Barr
Cravath, Swaine & Moore
New York, N.Y.

Significant Omission

"Complete System Security Seen as 'Rings' of Defense" [CW, Dec. 26-Jan. 2] had what I feel to be a significant omission.

For years, the Multics system (now owned and actively marketed by Honeywell Information Systems, Inc.; developed cooperatively by General Electric, MIT and Bell Labs in the mid-'60s) has been organized around so-called "rings of security" which implement the sort of structure Adrian Norman seems to desire.

The Multics system is felt (by many authorities more knowledgeable than myself) to be the most sophisticated large-scale computer system extant. It is the only system of its sort in the U.S. government inventory to be operationally running in a two-level military security environment: The Air Force Data Services Center (in the Pentagon) operates a Multics system with the Access Isolation Mechanism (AIM) features activated and has "top secret" and "secret" users and data.

I would also like to comment (and I am not with Honeywell) that I feel this omission is all too consistent with previous articles in CW. While IBM has a major share of the marketplace and deserves a major share of news reporting, Honeywell and the other "dwarfs" deserve a mention when appropriate.

Edward Hart Rice
Alexandria, Va.

85% Still in Operation

DP Crooks Going Unnoticed, Undiscouraged

By Jack Stone
And Ida Mason
Special to CW

Do you realize that computer-related bank embezzlements average about $500,000 — 25 times the typical noncomputerized embezzlement? Did you know that the average loss of all computer rip-offs, at least of those we know about, is vanishingly close to $1.09 million?

One of us chatted with Donn Parker recently at the Fourth Annual Computer Security Conference. (Parker is the author of the book Crime *By* Computer — must reading for all DP managers — and probably the foremost researcher in this field.) He reported that he has documented over 500 computer-related crimes and has begun to interview some of the criminals to try and uncover common patterns of behavior. He has stated that upwards of perhaps 85% of computer-based crimes have yet to be discovered.

Villain's Portrait

What is the profile of the typical computer crook? Researchers suggest this villain is a male, 18 to 30 years old, bright, eager, motivated, adventuresome, with no criminal record — in other words, the stereotype of the highly desirable DP employee. He also is so skilled at his profession that detection is extremely difficult.

As a matter of fact, computer-based crimes are rarely uncovered by today's audit or security personnel since computer thieves usually know far, far more about systems and technology. It seems that the culprits are only found out through chance events: A user accidentally notes some discrepancies in the normal pattern of events or an informant goes to work or the crooks have difficulty unloading the loot.

At present, there is no *federal* law that deters the computer criminal, in that none specifically prohibits the theft of computer time or data. But Sen. Abraham Ribicoff has introduced legislation (S. 1766) that provides up to 15 years behind bars and/or fines up to $50,000 for misuse of a federal computer system or a system involved in interstate commerce. Some action on this bill should be taken by the end of next year.

Sentencing Situation

In addition, the sentencing situation does little to discourage DP robbers. Many computer bandits receive probation and a company agreement not to prosecute in exchange for a complete revelation as to how the crime was committed.

Then there's the problem that prosecution may cost the company heavily in operational losses. Think of the implications of the case of the programmer who stole and tried to ransom critical programs back to the company for $100,000. He was caught and the programs were held in evidence.

Since the company had no backup copies, it was facing an operational disaster. So the president took the extreme action of breaking into the sheriff's office and stealing the programs back. The end of this saga was bizarre: The cops didn't know what programs were and the prosecuting attorney couldn't understand why a company would stop functioning without them so the entire matter was finally dropped.

The Human Connection

Some computer crooks have achieved the professional league status in the hierarchy of crimedom. Witness the Equity Funding fiasco. Here the larcenists were top ranking managers who developed a comprehensive system to help manage the issuance and merchandising of tens of thousands of bogus insurance policies to unwitting insurance companies. The multimillion-dollar fraud resulted in the second largest bankruptcy in the history of American business. There were 22 co-conspirators on the project team.

Scary Outlook

Here are some notes on just a few of the many documented cases of computerized fraud perpetrated by DP employees. When all are viewed together, one develops a rather scary outlook on the problem of controlling internal security.

One programmer embezzled simply by having the machine send him extra salary checks. He was caught only when someone noticed the checks piling up on his desk during his vacation.

Another programmer salted away about a million dollars from a company which he felt had broken its promise to share its profits with him. He reprogrammed some financial applications which reduced individual income items only by fractions of dollars. He then drew checks in his name for the aggregate of the unaccounted funds.

He finally turned himself in when he realized that, were he to stop cheating, company officials would notice a dramatic increase in profits.

Then there's the Byzantine case where dog track bettors who won their trifecta were short-changed without knowing about it [CW, Oct. 10]. Track workers were accused of substituting their own programs to calculate odds in their favor within a few seconds after the race and then collected the money that should have been paid to legitimate bettors by issuing themselves fraudulent tickets.

A short time before the crime was reported, one of the authors visited the track as part of a tour sponsored by a local DP group. When the DP manager was asked if it would be possible to rip-off the track, he responded, "Absolutely not!"

In next week's column, Stone will take a closer look at the "typical" computer thief.

Ida Mason, a professor of DP at Lehigh (Pa.) Community College, is currently on sabbatical doing research on women in management.

Lead to Consumer Distrust

Lost Controls, Poor Timing Mar Systems

A long-time member of Computer*world*'s publisher's staff recently had two occasions to distrust DP, even though her association with it over the years has been generally favorable.

First, the bank Rita McGrath has been using for over 10 years was unable to find her account; then, when it did find it, it sent her a "welcome new account holder" letter. Second, she returned some merchandise and is still waiting for credit.

The Taylor Report
By Alan Taylor CDP

Neither of these events is earth-shaking in its own rights. Neither of them shows any erroneous DP. However, both indicate the type of system problem we constantly overlook in our computerization methods, and, these problems are giving millions of consumers cause to distrust DP systems.

Unwelcome Letter

The story behind the welcome letter is a case of the lost bankbook. The book was lost two years ago, and there was an account number change as a result. Everything went well with the new account until one day the bank, having gotten hold of the old number, claimed Rita did not have an account with them and refused to cash her check.

This got straightened out, and the two accounts were apparently merged. However, this merging was mistakenly regarded as the formation of a new account and out went the welcome letter.

Returned Desk

The case of the returned desk is equally interesting in its apparent innocence. Patrick J. McGovern, Computer*world* publisher, is tall; even a large desk can make him feel cramped. So he has a tall, stand-up desk in his office and it is quite normal to find him comfortably working away there for hours on end. His only problem is typing.

The solution seemed to appear in a catalog item — a tall table with sloping top. Unfortunately, when it arrived, it turned out that there was nothing to support the typewriter at the necessary angle, so the table was returned.

And nothing happened. No credit note. No return memo.

When the American Express charge arrived, Rita crossed it off. Now she is waiting, more or less fearing that some month she will forget, pay it and then be out both the money and the table.

Rita reasonably does not like having to remember every month that this item is still open.

Information-Poor

In both of these situations, intermediate controls were lost as computerized systems were merged. This problem is very common and often goes unrecognized.

Who realized that when the card deck was being carried from the tabulating machine to the sorter and the operator looked to see that no cards were still in the tabulator, a control on the number of cards being passed from one phase to another was in process! How many times have you seen that control missed in computerized systems — with disastrous results?

In the case of the returned merchandise, no receipt and no time of entry into the books was provided. It is ironic that the information industry itself is the worst offender when it comes to failing to provide information.

In a manual system, a receipt would have been issued and the very next monthly statement would have contained the information. This is a control lost because of the expansion of the function to a third party. This created a delay that did not exist before. In Rita's case, this was the time between the return of the goods and the report of the return reaching American Express. No specific time is involved here, so the system is out of control.

It appears we are being taken in with our own name — data processors. In both the above instances, we quite correctly process the data. However, we do so without checking whether we are doing it at the appropriate time (welcome letter) or quickly enough (returned merchandise).

The need, therefore, is to concentrate on providing checks and balances to prevent processing at inappropriate times rather than putting all our efforts into the processing operations themselves.

© Copyright 1978 Alan Taylor. Reproduction for commercial purposes requires written permission. Limited numbers of copies for non-commercial purposes may be made provided they carry this copyright notice. The views expressed in this column do not necessarily reflect those of Computerworld.

RCA takes the mixups out of mixed-vendor maintenance.

Maybe your mixed-system headaches are systemic — caused by mixed vendor service personnel who are sometimes hard to get in touch with. Sometimes you don't know which *one* to get in touch with.

It means extra phone calls. Extra bookkeeping. Extra downtime. And extra hassle. It makes things tough on clients and manufacturers alike.

There's an easy way to end the problem. By calling RCA Data Services. The all-in-one service system that pinpoints problems fast — and solves them.

RCA has 180 service locations all across the country. And 15 strategically-located warehouses equipped for retrofitting or overhauling equipment on site.

Single-vendor maintenance for mixed-vendor systems makes sense. People with reservations systems know it. People with financial systems know it. And more and more manufacturers are finding out.

Find out more yourself. For full details and rates, call or write RCA Service Company, a Division of RCA, Data Services, Bldg. 204-2, Camden, N.J. 08101. Or find out faster by calling (609) 779-4400. We'll fix up your mixups.

RCA Data Services

Look Into Johnson Systems'

CICS/VS UTILIZATION MONITOR AND CHARGEBACK SYSTEM

"Now, a powerful data collection system that lets you accurately account for . . . and equitably bill for . . . all resources used by each user."

"The first feasible alternative to Performance Analyzer."

Send me your brochure about the new CICS/VS UTILIZATION MONITOR and CHARGEBACK SYSTEM.

Name ____________

Title ____________

Company ____________

Address ____________

City ____________ State ____________

Zip ____________ Phone (____) ____________

Computer ____________ Operating System ____________

C116

Johnson Systems, Inc.

8400 Westpark Drive
McLean, Virginia 22101
(703) 893-8700

Letters to the Editor

Human Rights at Home

I was fascinated to learn that the Association for Computing Machinery (ACM) has joined President Carter's campaign in defense of Anatole Sharansky's human rights [CW, Dec. 12]. This reverses an earlier refusal to deal with a similar case closer to home.

Several years ago, Clarke Squire, a black American dissident and computer specialist, was tried for criminal conspiracy along with 12 other members of the Black Panther Party. Squire was held in a New York prison for nearly three years in lieu of $50,000 bail. I was active in the successful campaign to raise the $50,000.

Squire was never freed during the trial because the judge revoked the bail when the $50,000 was presented in court. Later the jury acquitted all the defendants after less than an hour of deliberation ending the one-year trial.

During this period, several attempts to bring this case before the ACM membership were rebuffed. The leadership finally resolved that it would be inappropriate for a professional society to take a political position of any kind.

The trial and aquitted did not end Squire's troubles. He is now serving a life sentence for murder growing out of a shooting incident that occurred on the New Jersey Turnpike. He and a woman friend, Joanne Chesimard, were passengers in a car stopped for "speeding" by a state highway patrolman — an experience more common for blacks than most white Americans may realize.

The driver and patrolman both died in an exchange of gunfire. Squire and Chesimard were convicted of murder because of their mere presence at the commission of a felony even though the prosecution acknowledged that both defendants were unarmed. The trial was conducted in an atmosphere of deep prejudice and revenge resulting from the first trial.

All of the above stands in sharp contrast to the handling of Sharansky's case. President Carter made two comments bearing on Sharansky's guilt or innocence at recent press conferences. Last summer, Carter said he was convinced (sic) that Sharansky was not a CIA agent. He did not say he *knew* Sharansky was not an agent which is quite understandable judging by numerous reports of CIA conduct over the years. More recently, at a December press conference, Carter announced that a White House inquiry had determined that Sharansky was in fact not an agent.

One can only speculate what would have been announced if the inquiry had determined that Sharansky was an agent or had some other relationship to the CIA. The latter question was not mentioned.

Although Squire's case is now past, Carter is notably selective in his concern for human rights when it comes to current issues. In the case of the Wilmington 10 — a group of nine black and one white civil rights workers, Carter has refused comment based on the fact the the case is not under federal jurisdiction but is in the North Carolina courts.

The question of federal jurisdiction has apparently not inhibited his interest in Soviet jurisprudence.

Santayana is quoted as having written that history repeats itself — the first time as tragedy, the second as farce. I hope the ACM and President Carter can get their sense of appropriateness and jurisdictions defined more consistently before the next political trial in the U.S.

Edward H. Elkind
New York, N.Y.

Vehicle for Cheap Shots

The Dec. 19 lead editorial ~~(which~~ only very reluctantly praised the Association for Computing Machinery (ACM) stand on human rights] is petty and puerile. The purpose in publishing it seems only to have been as a vehicle for the two cheap shots in it.

The first is a criticism of any business which trades freely with all countries, rather than attempting to use its economic power for political (or what it claims to be "moral" or "patriotic") ends. To be consistent, one must therefore approve the actions of a business which discriminates against customers that are politically unpopular with the government or press of its home country. This would include, for instance, the Arab companies that boycott Israel, the South African companies that adopt racist hiring practices, and many companies which heed blacklisting.

I think we should be very grateful that the power of large corporations is confined to the economic sphere. The alternative is frightening.

The second interpolation is your mention of two other countries. While I am sure you would prefer to live in Transkei rather than Gulag, I will not pursue a further comparison of the unquestionably unethical policies of the regimes in question. What I cannot understand is the frame of mind in which only "South Africa and Chile come immediately to mind."

Why is it that you can only think of a capitalistic republic which is probably no more (nor less) racist than some parts of our country a few decades ago, and a right-wing military regime whose citizens are no less (nor more) free than most others on the same continent? Why are the Chilean culprits castigated before such blatant felons as Cambodia, Cuba or Czeckoslovakia?

In no way do I condone the violations of human rights that frequently occur in any of the countries mentioned. However, I am sick and tired of the selective criteria which somehow exempts those repressive regimes which violate economic and political rights simultaneously. Does repression become justified when it is conducted by a "dictatorship of the

(Continued on Page 19)

Letters to the Editor

(Continued from Page 18)

proletariate"?

Incidentally, the Soviet Union seems nearly benign, and even bourgeois, in comparison with some of the countries mentioned above. Perhaps that is why the liberal press now begins to dare to criticize it.

Bruce A. Martin
Middle Island, N.Y.

Instead of SPECIFY

I read with interest the letter suggesting a new Cobol verb [CW, Nov. 28]. Ket Watters thought that SPECIFY for switches should be added to the Cobol language. When a friend of mine who is just learning Cobol said the same thing, I was prompted to share the technique I have been using for years.

If the switch (or flag) is marital status, define the switch and its "88 levels" with the same "first" name for easy reading in the sorted crossreference, also define fields that contain the proper values for setting the "88 levels":

```
05 STATUS-MARITAL-FLAG     PIC X   VALUE '9'.
   88 STATUS-IS-MARRIED            VALUE '1'.
   88 STATUS-IS-SINGLE             VALUE '2'.
   88 STATUS-IS-UNDEFINED          VALUE '9'.
05 MARRIED-X               PIC X   VALUE '1'.
05 SINGLE-X                PIC X   VALUE '2'.
05 UNDEFINED-X             PIC X   VALUE '9'.
```

Then in the Procedure Division, rather than saying "SPECIFY STATUS-IS-MARRIED" we can code "MOVE MARRIED-X TO STATUS-MARITAL-FLAG."

We can use "88 levels" to be clear in IF statements and data names for literals to be clear in MOVE statements.

Additionally, I would like to point out that my version of the code in Data Division defines an initial value that is also the default value of UNDEFINED. The default value could have been "MARRIED" at the discretion of the analyst.

Also, specifying "PIC 99" for a switch or flag is rarely necessary. By coding the flag "PIC X," we can have up to 36 values for the flag (actually, we could go to 258, but it is not recommended). By using alphanumeric data we avoid generating any extra code to handle numeric data as well as using one less byte per record. (If the flag is in a record we obviously will put "MARRIED-X," etc. in the front of Working-Storage with other literals.)

One might think that the SPECIFY verb might generate less code. However, it is only a disguised MOVE and most likely would have to take longer to compile, since it must check to see what value the "88" is set at and generate the code to move the proper value to the flag. This will also require storing the right literal.

I hope this technique and these comments will be of help to some.

M. Patricia McLaughlin
Los Angeles, Calif.

Victims of the System

Heaven help us if billing procedures such as those utilized by Saks Fifth Avenue ["Saks Billing System May Violate ICCP Code," CW, Dec. 28-Jan. 2] are endorsed or even tolerated by the DP community.

Who knows how many thousands of people are, even today, wondering what happened to their credit balance and shrugging their shoulders as they write another check?

A system designed to allow fraudulent information to be printed on a billing form is not only unethical but immoral.

Jeff Holmes
Springfield, Mo.

Who's Being Unethical?

Public flogging for human error in a simple manual system seems to me to be a greater breach of ethics than the billing error by Saks Fifth Avenue ["Saks Billing System May Violate ICCP Code," CW, Dec. 28-Jan. 2].

Are we back in the era of "yellow journalism"? Is it time for Alan Taylor to switch to writing mystery novels?

Without access to Saks system data, there are some particulars which should be apparent to the outsider:

- There are regulations governing the handling of credit balances by such an organization. These may make an exception procedure advisable.
- There may be some types of processing which should not be totally automated.
- Using a flagged "H3" class bill would allow that bill to be mailed if the clerical procedure determines that the refund (or other exception) has already been processed.
- No professional signoff can prevent manual errors.

In this "trial by media," I suggest that the judge dismiss the case and find the prosecuter guilty of "contempt of court."

Eric Schulz
Los Angeles, Calif.

So That's News?

Just thought I'd mention my appreciation for the headline "LA36 Made Interactive" on Page 30 of the Dec. 19 issue. As many thousands of these have been used interactively with Digital Equipment Corp. machines and others for several years, DEC will no doubt also appreciate the headline. Keep 'em coming.

By the way, the article below that headline merited the attention the headline invoked. We have a number of users who find the LA36 speed a limitation.

John A. Beckett
Collegedale, Tenn.

Computerworld welcomes comments from its readers. Preference will be given to letters of 150 words or less. *Computerworld* reserves the right to edit letters for purposes of clarity and brevity. Letters should be addressed to: Editor, Computerworld, 797 Washington St., Newton, Mass. 02160.

The Computer for the Professional

Whether you are a manager, scientists, educator, lawyer, accountant or medical professional, the System 8813 will make you more productive in your profession. It can keep track of your receivables, project future sales, evaluate investment opportunities, or collect data in the laboratory. Use the System 8813 to develop reports, analyze and store lists and schedules, or to teach others about computers. It is easily used by novices and experts alike.

Reliable hardware and sophisticated software make this system a useful tool. Several software packages are included with the machine: an advanced disk operating system supporting a powerful BASIC language interpreter, easy to use text editor, assembler and other system utilities. Prices for complete systems start at $3250.

See it at your local computer store
or contact us at 460 Ward Dr.,
Santa Barbara, CA 93111,
(805) 967-0468

PolyMorphic Systems

New Horizons in CICS Education

ON LINE SOFTWARE INTERNATIONAL
"The link between business and computers"

- CICS/VS INTERNALS
  April 10-14 New York Area
  June 12-16 Los Angeles
- RECOVERY/RESTART
  Jan. 25-26 Boston
  April 19-20 New York Area
  June 21-22 Los Angeles
- CICS/VS LOGIC & DEBUGGING
  March 27-30 New York Area
  May 22-25 Boston
- CICS/VS PERFORMANCE & TUNING
  Jan. 23-24 Boston
  April 17-18 New York Area
  June 18-20 Los Angeles
- CICS/VS APPLICATION PROGRAMMING (Macro Level)
  March 20-24 Detroit
  May 8-12 San Francisco
- CICS/VS APPLICATION PROGRAMMING (Command Level)
  Jan 23-27 New York Area
  March 27-31 Detroit
  May 1-5 San Francisco
  June 26-30 Dallas

OSI offers a set of CICS courses that are unavailable anywhere else. We've structured six unique courses, covering initial exposure, detailed analysis of program logic, internals, and performance criteria.

Our instructors do not market CICS, they teach it. They are experts that have worked with CICS for years, resolving the problems that have brought you today's new enhancements. Their expertise allows you to fully utilize CICS and assures you the finest and most up to date education available.

Also Available for In-House Presentations

CALL NOW FOR COURSE DESCRIPTIONS AND ENROLLMENT INFORMATION!

TOLL FREE
800-631-8374
or in N.J.
(201) 423-3200

SOFTWARE PLAZA ROUTE 208 HAWTHORNE, N.J. 07506

[redacted]

Auditor Must Be Included In Systems Design Phase, Not Treated as Afterthought

Reader Commentary

By Ronald B. Smith
Special to CW

The DP auditor should be involved in most of the phases within the development life cycle (DLC) of a system. The purpose of this article is to show the involvement of the DP auditor in the most crucial phase of the DLC.

This phase is called systems design, which is basically the time when the working relations between the parts of a system in terms of their characteristic actions are specified.

In the past, auditors have audited computer systems after they have been implemented. This is auditing after the fact. Often the cost is too prohibitive to go back and modify the system to incorporate adequate controls.

Audit controls should therefore be built in during the system's design phase and not added after implementation of the system.

The DP auditor should be part of the systems development team which includes the users. His role within the team would be as an "independent advisor."

An independent advisor doesn't give or take orders from anyone on the team. The auditor's role is to make judgments on the controls and to make recommendations to the team. These are based on what might happen after the system is implemented.

His evaluations and recommendations should be written up and copies given to management, members of the systems development team and the corporate auditing team.

Guidelines to Follow

The DP auditor might use the following guidelines in his evaluations and recommendations:

1. Define and recognize control objectives as separate design requirements.
2. Look at the following control areas with emphasis on audit controls, audit trails, error correction procedures and adequate design documentation:
    a. Input preparation by user.
    b. Input transmission by user.
    c. Data preparation by the DP department.
    d. Computer processing.
    e. Output processing.
    f. Output reconciliation.

The two most important areas are computer processing and output reconciliation. These two areas should always be present and well documented.

3. Review the original cost/-benefits analysis to find out if the design phase was within budgeted cost.
4. Reexamine the budget costs for the subsequent phases within the DLC for any changes.

Auditor as Educator

The DP auditor and systems analysts should have a close working relationship. The systems analyst has two main goals. The first and primary goal is to design a system according to user requirements; the second is to have adequate controls in the system.

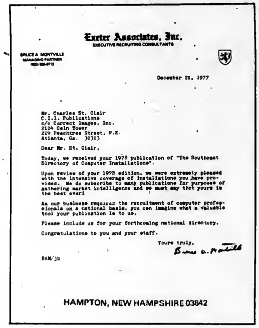
The DP auditor's only goal is to have adequate controls in the sys-

(Continued on Page 23)

Getting Yours?

THE SOUTHEAST

SOMEONE ELSE IS!



Exeter Associates, Inc.
EXECUTIVE RECRUITING CONSULTANTS

BRUCE A. MONTVILLE
MANAGING PARTNER

December 21, 1977

Mr. Charles St. Clair
C.I.I. Publications
c/o Correct Images, Inc.
2104 Cain Tower
229 Peachtree Street, N.E.
Atlanta, Ga. 30303

Dear Mr. St. Clair,

Today, we received your 1978 publication of "The Southeast Directory of Computer Installations".

Upon review of your 1978 edition, we were extremely pleased with the intensive coverage of installations you have provided. We do subscribe to many publications for purposes of gathering market intelligence and we must say that yours is the best ever!

As our business requires the recruitment of computer professionals on a national basis, you can imagine what a valuable tool your publication is to us.

Please include us for your forthcoming national directory.

Congratulations to you and your staff.

Yours truly,

BAM/jb

HAMPTON, NEW HAMPSHIRE 03842

Exeter Associates and hundreds of other companies are getting your share of the market in the Southeast. Whether you're an agent/recruiter, a vendor, or an EDP consultant, you can't afford to overlook the ever-changing, ever-growing Southeast data processing market.

THE SOUTHEAST DIRECTORY OF COMPUTER INSTALLATIONS

...with over 1,200 listings in Eight Southeastern states will put you back into the market!

Each listing contains company name, address, phone, key contact, time for sale, hardware, languages, and applications.

Get Into The Southeast... You'll Get Alot Out Of It:

Immediate Delivery On All Directories Ordered Today

THE SOUTHEAST DIRECTORY OF COMPUTER INSTALLATIONS

NAME________ TITLE________
COMPANY________ ADDRESS________
CITY________ STATE____ ZIP________
BOOKS____ X $85.00 =________
☐ CHECK ENCLOSED ☐ M.C. #________
☐ B.A.C. #________ ☐ C.O.D.
☐ C&S #________

C.I.I. PUBLICATIONS
Suite 22-0
300 Peachtree St. N.W.
Atlanta, Georgia 30308
(404) 659-4145

A Truly Unforgettable Character

Eureka Armpit: Programmer Extraordinaire

By Miles Benson
Special to CW

Sociology of Computing

In my memory bank of Most Unforgettable Computing Characters, Eureka Armpit looms large.

Eureka was not his name, of course. It is, however, appropriate to what is memorable about him. To put it bluntly, Eureka was offensive in just about all the ways a programmer can be offensive.

I have some misgivings about telling this story. I mean, picture the scene. There's Eureka, settling back for a little light reading, cracking open this volume to this page. The realization slowly dawns on him that "Eureka" is really a substitute for his own name. That could be an unpleasant shock.

You see, Eureka never meant to be offensive. He was as good-hearted as any programmer I've ever known. It's just that when the points were given out for regular bathing, or refraining from nose picking, or sock changing, Eureka came in low. Very low.

Episode No. 1

There are two incidents that stand out in my memories of Eureka. One involves another person, the other involves an architectural wonder.

Bonnie Nosegay was a mild-mannered, sweet-as-could-be programmer at the Clever Devil Toy Company at the time Eureka came on-board. In the nice person league, Bonnie was in the 99th percentile.

When Stalwart Axeswinger, head of computer operations, chewed out Bonnie and some of the other programmers in a unique collection of four letter words for lack of cleanliness around the keypunch, it was Bonnie who sweetly agreed that perhaps they had been a little slovenly.

When Clarissa Cardchip misoperated the card reader and returned all the cards read that day to the programmers intermixed in a basket, it was Bonnie who shrugged her shoulders and sorted them all back to their original order.

Bonnie, in short, was impervious to the pressures that totally unnerved the rest of us.

Perhaps it was because of her good nature that Eureka was assigned a desk in her area. Whatever the reason, Bonnie and Eureka became neighbors.

The first day of this misbegotten alliance, a close observer might have spied a slight wrinkling of Bonnie's nose. By the second day, the wrinkle had become severe. On the third day, even unflappable Bonnie had had enough.

It wasn't just the odors that bothered her, Bonnie told her supervisor. It wasn't even that Eureka scratched himself frequently and vigorously. It was *where* Eureka scratched himself that finally made her act. Some things, she felt, just shouldn't happen in public.

> *'. . . For all of Eureka's strangeness, I still harbor some feeling for the guy. I mean, we computer folk all have our own personal weirdness, right?'*

Eureka was moved to a new desk in a nearly deserted area that same day. Bonnie's good will was too fine to tax any longer. And that was the end of memorable episode No. 1.

Episode No.2

The other episode requires a brief description of the Clever Devil facilities. You see, Clever Devil computerized early in the digital game, compared with its competitors. I mean, it leased its spiffy new Marketronics 3 Pi computer as No. 4 on the order list when Marketronics first brought the beasty out in the mid-'60s.

And because Clever Devil was proud of its computerization and its computer, it entombed it in an architecturally gorgeous mausoleum on the very front of the Clever Devil acreage, right next to the open-to-the-public showroom where toys are available just a teensy bit over wholesale. A decade of excited children have peered in electronic awe through the huge plate glass windows that expose the tape-whirring, light-blinking behemoth to the public.

In fact, so proud was Clever Devil of this edifice and its contents that, to complete this architectural marvel, it erected a giant and lovely fountain beside the front doors. The splashing, night-lighted waters was reflected in the computer center windows, and sometimes the 3 Pi seemed to be arising from a lovely sea, transcending its concrete environment.

And that brings us back to Eureka Armpit. In addition to his other unique traits, Eureka was a hurrier. Where most of us amble, Eureka would trot. Those who wandered the Clever Devil hallways kept a peripheral eye open for the scurrying Eureka, lest they be impaled in a high-speed collision on the pencil he kept nesting on his left ear.

In fact, the kindest nickname among the many which were hung on Eureka over the years was "Dasher." Dasher moved so

(Continued on Page 22)

"We have not yet begun to distribute."

A Special Report
on Distributed Data Processing
in our February 27th Issue

According to independent studies by Becker Research, Inc., only 20% of *Computerworld* subscribers' organizations "currently use a distributed approach to data processing," so the buzzword of the late 70's has yet to become a byword.

On the other hand, 27% of *Computerworld* subscribers say their organizations are now "planning to use a distributed approach to data processing" — which indicates a substantial current interest in what some have called the wave of the future.

Of course, there are still wide differences on just what is meant by distributed data processing. And that's one of the topics to be covered in our February 27th Special Report.

Edited by Esther Surden, this report will gather opinions on what DDP is from several sources, including mainframe manufacturers and users.

It will also give some practical help to DDP users and prospective users — with articles on configuring networks, distributing data bases, and selecting and maintaining equipment.

"Distributed Data Processing" will also report on users' experiences with DDP — both pro and con.

If you're into DDP, planning to be into it, or thinking about it at all; this report is the place to be when our February 27th issue reaches your desk. Closing date is February 10th.

And if you're marketing products or services in the DDP field, make sure your ad is there. Contact your *Computerworld* salesman, or call Terry Williams at (617) 965-5800.

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

Boston	New York	San Francisco	Los Angeles
Bob Ziegel Mike Burman	Don Fagan Frank Gallo	Bill Healey Jim Richardson	Bill Healey Jim Richardson
(617) 965-5800	(201) 461-2575	(415) 495-0990	(213) 475-8486

Eureka Not Forgettable

(Continued from Poge 21)

rapidly, it was humorously said, that he often arrived before his odor.

You may be wondering at this point about the role of the fountain in this story. Or you may not be. You may have perceived that the fountain was an inevitable destination for the full-race Dasher.

Arrive there he did. While hurrying in to work one day, passing other late-arriving employees at 7:59 a.m., Eureka took a shortcut. Heading for the front door of the computer center, Eureka elected to step up onto the lip of the fountain.

Precariously balanced, he thus attempted to proceed with unabated speed toward the front door. He failed to account, however, for the slipperiness of the fountain edge. First his left foot and then the remainder of his rapidly moving body descended into the water.

The startled throng of late arrivals was first shocked, then amused, by the sight of Eureka, still moving at an only slightly diminished speed, splashing mightily through the Clever Devil fountain. (It is said, apocryphally I am sure, that Eureka only lost two places in his race for the front door.)

Most of us, at least somewhat humiliated and decidedly uncomfortable, would have slunk away home at that point.

Not Eureka. He stuck it out. The full eight hours. Soaked to the bellybutton. Not even dry by noon.

If the dry Eureka cast dubious odors, you can imagine what the wet one did. It was a memorable day for all of us Clever Devil computer types.

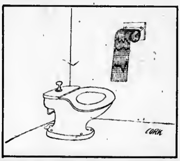
Well, there's the story. Eureka Armpit, programmer extraordinaire. And most unforgettable character.

But I have to add one more thought. You there, reading this story, wondering if Eureka Armpit is really a pseudonym for your own. It's not.

For all of Eureka's strangeness, I still harbor some feeling for the guy. I mean, we computer folk all have our own personal weirdness, right?

So I disguised just enough of the story's details to keep the probability of self-recognition down to zilch. Eureka, your own mother wouldn't even recognize you.

Your secrets are safe — even from yourself.



WANTED

Recently promoted data entry supervisor or manager Responsibilities include attending the interactive management course for data entry managers and supervisors sponsored by

MIC Management Information Corporation
140 Barclay Center
Cherry Hill, N. J. 08034

This 3-day course covers

- department organization
- operator productivity
- training
- personnel motivation
- data controls

The seminar is offered February 27. — March 1, 1978, and May 22 — 24, 1978 at the Cherry Hill Inn in Cherry Hill, N. J.

For more information, call Larry Feidelman **COLLECT** at (609) 428-1020

OCR

Mr. Data Processing Manager...

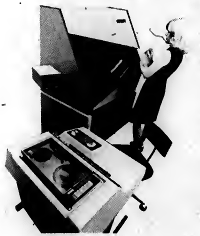
want to protect your keypunch kingdom?

Then don't let your boss see this ad!

It's a recognized fact that over 30% of costs in the average computer installation are for data entry. The unique Laser OCR-ONE optical character recognition system has been specifically designed to reduce those costs. In fact, it's cost justifiable for the replacement of only three key stations.

A Laser OCR-ONE user has reduced their keypunching staff by over 50% . . . with savings amounting to more than $10,000 a month!

We'd welcome the opportunity to give you a demonstration and provide detailed information on the remarkable advantages of the Laser OCR-ONE.



Contact me today for complete cost-saving information.

Billy Graham
Vice President/Marketing

Optical Business Machines, Inc.
804 West New Haven Avenue
Melbourne, FL 32901
(305) 727-1774

An affiliate of Florida Data Corporation

I'd like more information about the Laser OCR-ONE

Please send descriptive literature ☐
Please have a salesman call me ☐

Name
Title
Company
Address
City
State
Zip Phone

J

DP Auditor Must Play Part In Systems Design Phase

(Continued from Poge 20)

tem. Since the primary goals of the systems analyst and auditor differ, there has to be a meeting of the minds.

It's up to the auditor to educate the systems analyst on the importance of adequate controls. In fairness to the systems analyst, he can't always implement adequate controls because of user requirements and/or the need to meet tight implementation dates.

Since it is his system, the user must be made to realize he has to have complete responsibility for the controls. All too often, the user doesn't know all the controls in his system and doesn't even realize that he should be responsible for the controls.

The user should know that his system must have the proper controls, be aware and be responsible for all of the controls. This has to be part of the user's job description.

Role of Top Management

To make the role of the DP auditor during the systems design phase and the other phases within DLC a success, top management must mandate certain responsibilities for the user, DP department and DP auditor.

The users must be aware and responsible for all controls in their present systems, ensure proper controls are implemented in proposed or new systems and ensure any modifications to the current systems have adequate controls.

The DP department must include the DP auditor as part of the systems development team and, as much as possible, cooperate with him. The DP auditor should also be made aware of any design modifications to current systems and be invited to any state-of-the-art training sessions for personnel.

The DP auditor must have sufficient DP training and knowledge to make the above happen.

Smith, who has o degree in accounting, is a senior systems analyst ot Carrier Corp. in Syracuse, N.Y.

'You and Your, Sure, It Will Be a Breeze . . . Just Hook Me Up to the Bank's Computer and . . .'

Recruiters/ Agencies

THE SOUTHEAST
DIRECTORY OF COMPUTER
INSTALLATIONS

Ampex memory for PDP-11/70. Spend less, get more.

Add Ampex memory to your PDP-11/70. You'll get better performance than you would with DEC's own memory, and you'll only spend around half as much money.

Money isn't the only thing you'll save with Ampex memory. You'll save time, too. Using four-way interleaving, effective cycle time of an ARM-1170 memory is 350 nanoseconds. Even without interleaving, Ampex memory cycles within 725 nanoseconds.

Ampex ARM-1170 memory comes in increments of 128K bytes and can expand a PDP-11/70 computer all the way to 4 megabytes.

DEC has a great product in the PDP-11/70. And now you can make yours work even better, and save some money at the same time. Order your PDP-11/70 memory from Ampex and get it now.

AMPEX

Ampex Memory Products Division
200 N. Nash Street • El Segundo, California 90245
(213) 640-0150

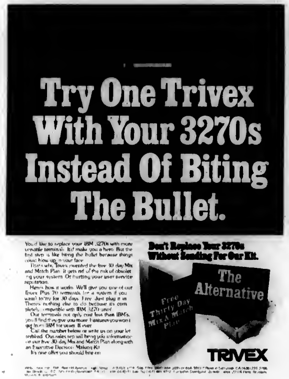
The only connection between Digital Equipment Corporation and Ampex Corporation is the one you make yourself when you plug our memories into their computers

Don't Replace Your 3270s Without Sending For Our Kit.

So far, every company that's bitten on our free 30-day trial offer has decided to keep our equipment. Very good, but not surprising.

Because they all proved to themselves Trivex Plus 70 terminals are more versatile than IBM 3270s. And they did it without biting the bullet. Without danger of obsoleting their systems. Or hurting their user service reputations.

That's the beauty of our Mix and Match Plan: We give you one of our terminals (or a whole system if you want) to try for 30 days. Free. You just plug it in. It's *completely* compatible with IBM 3270 units. The same goes for our controllers and printers. So you can mix and match our equipment with IBM's any way you want to.



Try One Trivex With Your 3270s Instead Of Biting The Bullet.

You'd like to replace your IBM 3270s with more versatile terminals. It'd make you a hero. But the first step is like biting the bullet because things could blow up in your face.

That's why Trivex invented the free 30-day Mix and Match Plan. It gets rid of the risk of obsoleting your system. Or hurting your user service reputation.

Here's how it works. We'll give you one of our Trivex Plus 70 terminals (or a system if you want) to try for 30 days. Free. Just plug it in. There's nothing else to do because it's completely compatible with IBM 3270 units.

Our terminals not only cost less than IBM's, you'll find they give you more. Features you won't get from IBM for years. If ever.

Call the number below or write us on your letterhead. Our sales rep will bring you information on our free 30-day Mix and Match Plan along with an Executive Decision-Making Kit.

It's one offer you should bite on.

Don't Replace Your 3270s Without Sending For Our Kit.

Then you sit back and watch how well our equipment works alongside theirs. You'll see what ours gives you that IBM's doesn't. Features like in-line, on-line and off-line diagnostic capability. Local display-to-print capability. OCR wand. High-resolution, non-glare CRT. Prompting line. Cursor position indicator. Statistical package. And 10-key numeric pad. Features you won't get from IBM for years. If ever. And all Trivex 3270-compatible devices are micro-processor controlled. They're software-modifiable to future changes in network requirements.

Meanwhile, you'll find out our equipment also costs less than IBM's.

Once your 30 days are up, unplug our Plus 70 System and send it back. No problem. Or, like those who've tried it, you can keep it.

Now you've got to admit biting on an offer like this is a lot better than biting the bullet. Just call the number below or write us on your letterhead. A salesman will bring you information on our Mix and Match Plan along with an Executive Decision-Making Kit, complete with operating instructions and a real bullet.

Then we'll give you our best shot.

Write: 3180 Red Hill Ave., Costa Mesa,
Ca. 92626 • Phone: (714) 546-7781,
(800) 854-3810 or 854-3819.

TRIVEX

Offices in San Jose, Calif. (408) 226-3766/Oakbrook, Ill. (312) 325-8108/Detroit, Mich. (313) 528-2175/ Ft. Lee, N.J. (201) 461-4712. European Distributor: Synelec, Telex: 22114 Paris, Brussels, Munich, Amsterdam.

Everyone That Bit On Our 3270 Offer Is Now A Customer. Why?

Study Shows Payoffs

User-Coded Requests Improve Decisions

By Leslie D. Ball
Special to CW

A research project was recently completed which took a look at what would happen if general management were given the opportunity to code report requests, rather than requiring the DP department to code the request for the users. The project was jointly sponsored by Program Products, Inc., which markets the Data Analyzer package and The Tanner Companies, a Phoenix construction firm.

The research team consisted of myself, Dr. Steven D. Wood and doctoral candidates Peter Simis and Raymond Kluczny, all then associated with the College of Business Administration at Arizona State University. Executives from both Tanner and Program Products also participated in the project.

The main objectives of the project were to determine:

- Whether the managers would actually do the coding rquired to use the Data Analyzer.
- The types of reports that would be requested.
- The features of the software package that would be utilized.
- The behavioral effects that might result from using the package.
- The benefits that Tanner's managers would find from using the package.
- The difficulties that would be encountered with the system.
- The impact that use of the package would have on Tanner's DP department.

Implementation of the Data Analyzer was completed last March on Tanner's IBM 360/40, which operates under DOS. Prior to implementing the software, the research team developed a data dictionary that identified and described all data items the users would be allowed to access.

A training session was scheduled for potential users. Because virtually all of the company's management, including President Maurice Tanner, were scheduled to attend the session, it was necessary to conduct two sessions.

Thirty-two managers attended either of two one-day training sessions, with a second day available for those who desired training in the use of the package's more advanced features.

Following the training sessions, users were allowed to code any report request that they wished, provided that the data existed in the company's data files and that they had authority to see such data.

During the four-month project, 53% of the executives who attended the training sessions wrote one or more requests. A total of 112 requests were processed by the DP department.

Of the requests made, 95% would *not* have been made had the Data Analyzer not been available. The researchers believe this indicates there is a significant number of management information needs that are not being satisfied when traditional procedures are employed.

Much to their surprise, the researchers found the users took an average of only 34 minutes to mentally develop and code their report requests.

The researchers also found:

- Although most upper level managers made some use of the Data Analyzer, subordinates most often coded the requests.
- Most reports selected and summarized specific information from files containing detailed data.
- Most requests were written employing only the most basic commands available.
- Users developed an increased appreciation for the tasks performed by the DP department.
- Tanner's management felt that the reports it received were valuable to its decision-making responsibilities, that the software package proved an effective management tool and that they learned much about the amount and a type of data available.
- Difficulties were encountered by the users who employed the package in more than a rudimentary manner because of the increased learning time required.
- The DP department should expect to receive long-term benefits because of the increased DP knowledge gained by the users.

Ball is an assistant professor of mathematics at Babson College in Wellesley, Mass.

Report Writer Backstops Cobol Shop

TULSA, Okla. — Pepsico, Inc.'s Transportation Division, based here, includes busy operations such as North American Van Lines, Inc., National Trailer Convoy, Inc. and General Insurance Adjustment Co.

Eighty persons work in the systems section of this division. Charles Rodman, lead systems analyst, and Dan Baker, special projects analyst, work with an IBM 370/155, under DOS/VS and a software line-up consisting of DYL-260 from Dylakor Software Systems, Environ/1 and Total from Cincom Systems, Inc., Epat from SDI, Inc. and The Librarian from Applied Data Research, Inc. The Dylakor system interfaces with the latter three.

Baker (left) and Rodman

"We're a Cobol shop. We use it for our normal development work. But while Cobol is our standard, we use DYL-260 in conjunction with it whenever time gets tight," Baker said.

Rodman and Baker have used DYL-260 almost from the day it first became available. The division operated Dylakor's DYL-250, an extended utility, before that.

"DYL-260 has been an essential part of our operation for years," Baker said. "It's always the first method we consider for accomplishing any time-sensitive project, no matter how complex the project."

Coding, Testing Speed

Rodman explained why: "Our experience has demonstrated that the time interval from project request to finished project is reduced dramatically by using DYL-260 rather than Cobol. The man-hours we save in coding, punching and testing is substantial, and when debugging is necessary, the process is simplified by the DYL-260 comprehensive error analysis, which makes the core dump all but unnecessary.

"The package has been especially useful on special projects which otherwise would be impossible to complete in the required timeframe," he added.

Complex Project

Rodman and Baker described one project in particular which was especially complex and time-critical. "We were required to design a system for tracking vehicle license expirations. DYL-260's update and editing feature gave us the foundation we needed."

"The addition of four report programs, one of which has the ability to look both forward and backward in time to tell us about expirations, enabled us to complete this entire assignment in less than two weeks. We are confident that had we used Cobol exclusively for this job, it would have taken a minimum of four weeks."

You Name it! Jasper Does it!

JOB ACCOUNTING & BILLING SYSTEM FOR OS, DOS/VS, POWER/VS, DOS

NEW FEATURES: Wizard Report Generator • CICS Billing • RJE Accounting FREE TRIAL 1977 DATAPRO SOFTWARE HONOR ROLL

Yes! Rush full information about Jasper & the 30 day Free Trial DATACHRON 174 FIFTH AVE. NEW YORK N.Y. 10010 For faster action call collect (212) 675-5333

NAME ____ TITLE ____
CO. ____ TEL. ____
ADDRESS ____ CITY ____
STATE ____ ZIP ____ COMPUTER MODEL ____ SYSTEM ____

LE
AND BU
ARE ON
SPEAKING
TERMS.

You're probably very happy with your Burroughs mainframe

But you'd undoubtedly like to have the versatility and dependability of Lear Siegler terminals If only they were compatible with your present system

Now they are Complete with standard Burroughs polling and address line disciplines

What's more, the ADM-2B's forms mode capability is compatible with the TD-820

The ADM-2B gives you full text editing capabilities Including erase to end of line/field/page Insert and delete character and line Blinking and blanking fields And tabbing

Just flick a switch and you can convert the ADM-2B to a standard ADM-2 with Burroughs line discipline.

Line diagnostic mode is switch selectable — which makes it extremely valuable for troubleshooting

Of course, there's all the support that Lear Siegler is famous for Throughout the United States and in many foreign countries

$2485

That's the full price. Including, serial printer port Numeric keypad. 24x80 character screen. 16 function keys. 110-9600 baud. RS232 interface Burroughs two-wire direct connect is available as an option

The fact is, Lear Siegler's new ADM-2B terminal gives you the best of both terminals So you can use it right alongside your present Burroughs terminals and mainframe

So rest easy, Burroughs users Because now Lear Siegler speaks your language

For more information contact Lear Siegler, Inc, E I D /Data Products, 714 N Brookhurst St, Anaheim, CA 92803, (800) 854-3805 In California (714) 774-1010

LSi®

THE ADM-2B.
SMART TERMINAL.
SMARTER BUY.

'Cadmat' Manipulates Large Data Collections

ATHENS, Ga. — Developed by the National Aeronautics and Space Administration's Aerospace Safety Research and Data Institute (ASRDI), the Combined ASRDI Data Management and Analysis Technique (Cadmat) package form Cosmic enables users to work with large quantities of data organized into records or events and parametric fields.

The records of events can be made up of as many as 32K rows while the parametric fields can be represented by as many as 60 columns. Each data element is presented as either a single 4-byte floating-point number of a 4-byte "fact" or alphanumeric character string.

The software is particularly useful when data, such as the results of a test program, is continually being accumulated and when the need for retrieval and analysis is ongoing, according to a spokesman for the clearinghouse.

Written for use with IBM's TSS environment, the package could be modified to run with other operating systems, the spokesman said. An abstract of the program warns, however, that it can accommodate only one user at a time and is not suitable for situations requiring simultaneous multiple-user access.

Cadmat accommodates raw data in virtually any Fortran-readable format, but an understanding of Boolean algebra and set theory is necessary in order to use the system.

A selection of data analysis features are available to the user. These include the generation of graphs and histograms, alphanumeric sorting, calculation of means and variances as well as statistical and mathematical modeling, the spokesman said.

An administrative facility controls user access to particular files while a secondary access mechanism within each file partitions sensitive fields and sensitive activites.

Written in Fortran IV for IBM's Fortran H compiler, the package has been implemented on a 360 with 1M byte of memory. Cataloged as LEW-12570, the program code costs $750, the documentation an additional $17.

Cosmic is at 117 Barrow Hall, University of Georgia, Athens, Ga. 30602.

DEC Extends CAI Support

MAYNARD, Mass. — Version 2 of Digital Equipment Corp.'s CAI Author Language (Decal), an interctive lesson development system for individualized, computer-assisted instruction (CAI), contains language extensions permitting creation of simulation and gaming exercises.

Decal allows instructors with little or no DP background to create, modify and administer CAI lessons and tests in a variety of subjects, a spokesman claimed.

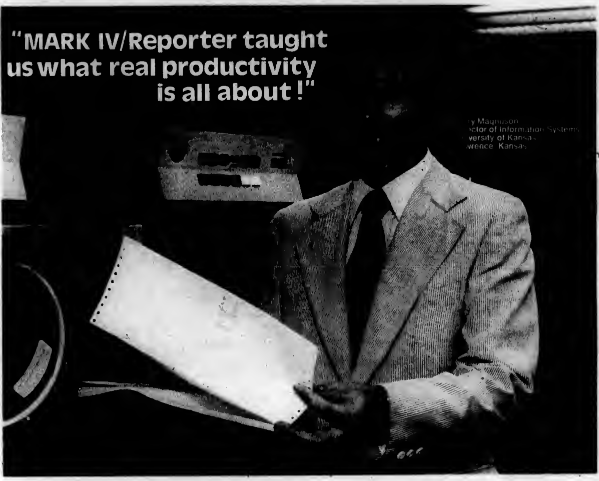
Version 2 gives the instructor access to 52 user-programmable variables and accommodates Basic-Plus language statements within lessons to provide greater branching, response-checking ability and less flow control, he said.

The update also includes an on-line calculator mode for mathematical operations and a random question selection option. The system logs student activity and test results, DEC noted.

A multiple keyword response feature allows a variety of responses to questions and a response-matching capability enables the system to recognize common misspellings, the spokesman added.

Available now, Decal Version 2 operates in a RSTS/E environment on DEC's PDP-11s and can be licensed for $1,000. Current users of Decal can obtain the update for the cost of the media, the spokesman noted from DEC's Education Products Group.

Sales/ Marketing
Incentive Industry
Outstanding opportunities with leader in the incentive industry. See our ad in the Classified Section, or contact
John Jack
BUSINESS INCENTIVES, INC.
P.O. Box 1610
Minneapolis, MN 55440
An Equal Opportunity Employer


"MARK IV/Reporter taught us what real productivity is all about!"
y Magnuson
ctor of Information Systems
versity of Kansas
wrence Kansas

"We purchased e General Ledger accounting system from a major vendor. After investigating, we found that we were going to have to drastically change the Cobol programs in order to generate all the required reports.

"Rather than this, we concluded that it would be far better to start from scratch and use MARK IV/Reporter for the 75 to 100 daily, weekly, monthly and year-end accounting reports that we produce. We made the right decision. If we had tried to modify the Cobol report writer that came with the system, it would have taken us at least two months longer to complete the project.

"MARK IV/Reporter was installed on our 370/145 within a few hours. The four people who attended a basic MARK IV/Reporter class were using it comfortably within a week. We elso have a competent Cobot programmer who took the MARK IV® manuals home and read them over a weekend. He started using MARK IV/Reporter the next Monday morning.

"It runs very efficiently and it's helped increase the productivity of our systems and programming staff. With the confidence we've gained in MARK IV/Reporter we can commit to new projects now that would have been impossible before. We'll be using it for 50% of our new work, which includes a new student records information system. MARK IV/Reporter will be a key part of this new system. "As for Informatics Support, our staff here is very impressed; their people have been extremaly competent and the systems engineering support has been excellent."

WHAT IS MARK IV/REPORTER? MARK IV/Reporter is en information processing system which handles all reporting requirements for existing file and/or data base systems. Although extremely flexible and powerful, the system allows non-progremmers to produce error-free reports in e fraction of the time required with conventional programming methods. MARK IV/Reporter can be installed and implemented in the U.S. and Caneda for as little as $306.00 a month. MARK IV/Reporter is upward-compatible to MARK IV whose 1,300 instellations worldwide make it one of the most successful software products of all time.

informatics inc Software Products

World's Leading Independent Supplier of Softwere Products

Member SIA Software Industry Association

Informatics Inc., Software Products, Dept. 1177D
21050 Vanowen St., Canoga Park, Calif. 91304

Name____________________
Title____________________
Dept.__________ Computer__________
Firm____________________
Address____________________
Phone____________________
City____________________
State/Province__________ Zip__________

The ecquisition of Mark IV was made possible by e grent of the University of Kansas Endowment Associetion
Mr. Magnuson oversees edministretive DP ectivities for the Lewrence cempus 'The views expressed are those of Director Jerry Magnuson end not necesserily those of the University of Kansas

'DMS/OS' Compresses PDS

SACRAMENTO, Calif. — The DASD Management System (DMS/OS) from Software Module Marketing, Inc. (SMM) now includes support for compression of partitioned data sets (PDS). This allows IBM OS-based sites to allocate space as a function of the content of the PDS, an SMM spokesman said.

DMS/OS supports the archiving and retrieval of data sets, high-speed but selective dump/restore, a range of scratch options and data set fragmentation control. An interface for teleprocessing and support for reloading from one type of disk subsystem to another are also part of the system, he said.

As the facility is implemented, the compression can be invoked by specifying data set names or by designating volumes to be scanned for eligible data sets, he added.

Copies of PDS eligible for compression are maintained in case of conditions that would prevent the reloading of a PDS after the loaded version had been rendered inoperative.

The PDS compression is provided free with the DMS/-OS basic package, which costs $10,000, SMM said from the Crocker Bank Building, Penthouse, 1007 Seventh St., Sacramento, Calif. 95814.

Deltak Users to Meet

CHICAGO — The 1978 Deltak, Inc. users conference, scheduled for mid-April here, will include keynote addresses by Dr. Herbert R.J. Grosch, president of the Association for Computing Machinery, and Capt. Grace Hopper of the U.S. Navy.

Other speakers will include Dr. J. Daniel Couger, the Data Processing Management Association's man of the year, and Michael Jackson, developer of a structured design methodology.

The April 17-19 meeting will also consider such issues as DP management training, the development of effective instruction and design of a learning resource center.

The registration fee is $100. Deltak, Inc. is at 9950 W. Lawrence Ave., Schiller Park, Ill. 60176.

FP Hardware Use Cuts Runtimes For Banks' Work

ORLANDO, Fla. — The latest version of Florida Software Services' Certificate of Deposit accounting system, CD III, includes a fast processing option and support for new government regulations as well as better documentation, according to a spokesman.

Users with floating point (FP) hardware can utilize it instead of software to handle parts of the package's processing logic. This can cut runtimes substantially, he claimed.

Logic has been extended to meet all Individual Retirement Account (IRA) requirements recently released by the government, he added. Meanwhile documentation has been expanded and separated into two manuals.

The package is written in Cobol and runs on IBM 360/370s, Honeywell 6000 series CPUs and Burroughs medium-scale systems. It ranges in cost from $15,000 to $20,000.

Florida Software Services can be reached through P.O. Box 2269, Orlando, Fla. 32802.

UP YOUR
PERFORMANCE
with the
EDP PERFORMANCE
REVIEW

A monthly review of techniques and methods, products, literature and services to help EDP management achieve maximum productivity.

- **Tutorial Reports**
- **Products & Services**
- **Current Literature**
- **User Experiences**

Subscription: $48.00/year.
Write now for a free
sample issue and index.

Applied Computer Research
P. O. Box 9280
Phoenix, AZ 85068
(602-944-1589)

Man cannot live

That's why so many companies are firing their small batch systems and hiring the Hewlett-Packard 3000.

Our computer can easily handle your payroll, accounting, general ledger and other number-crunching jobs you're currently running on a time-sharing service or small in-house system.

But it also gives you immediate access to the information you need right now. Today's sales, inventory status, customer profiles, shipping records, updates on accounts receivables, projections — all these and more can be called up on CRTs or printing terminals.

Just about every business, from manufacturing and distributing to retailing and publishing, needs that kind of up-to-the-minute data. And, with prices starting at $75,000,* it's easy to make the switch to an HP 3000.

The $75 swer.
U.S. domestic price for HP 3000 at additional cost.

At Canadian MVS Site

Performance Monitor Helps Control TSO Use

TORONTO — The Canada Life Assurance Co. operates two major on-line networks, including TSO and CICS, on a 5M-byte IBM 370/168 running under the latest release of MVS. The firm has been using MVS since August 1975 and has used IBM's Time-Sharing Option (TSO) to support corporate users ranging from the British Isles to the headquarters office here as well as a growing base of outside customers.

As TSO usage has increased, precise management of the TSO system has increased in importance, with special interest in controlling the misuse of time-sharing standards, terminal work-habits, and establishing a capacity management capability, according to Arne Ljungstrom, one of the firm's DP officers.

Until the company acquired TSO/MON from Morino Associates, its attempts at controlling TSO usage were limited. The tools available — including IBM's Resource Measurement Facility (RMF), the Program Control Facility (PCF), an SMF exception analyzer, an on-line MVS monitor and numerous in-house aids — although valuable for their primary purposes, simply did not provide the information necessary to satisfy their requirements for management for the TSO network, he said.

Although most organizations view a product such as TSO/MON from a "performance" frame of reference, Canada Life was quick to recognize the product's value for analyzing TSO use, specifically in terms of user productivity and standards enforcement.

TSO/MON has made it possible to study terminal usage patterns to gauge programmer productivity. One approach was to determine an indicator for assessing terminal activity.

In working with IBM, Canada Life postulated that an "active" terminal user would experience an average user think time of approximately 20 seconds. TSO/MON reports verified this hypothesis. With this measure as a yardstick, it will be possible to assess the level of user activity, so that inactive users can be identified, Ljungstrom added.

Additionally, the information provided by TSO/MON enables one to understand what work is being done when, allowing management to track just how much TSO is used on an overtime basis.

Standards Enforcement

In addition to productivity analysis, TSO/MON information reporting features provided a means for standards enforcement. For example, because of the performance impact considerations of a foreground Cobol compilation, a standard has been established prohibiting their execution during prime service times. Yet, in a seven-day period the information provided by TSO/MON identified 154 violations.

In another situation, Canada Life has been able to identify users invoking unauthorized programs, thus uncovering a security violation situation.

The management of the Canada Life data center realized that in order to provide a cost-effective and service-oriented TSO system, it would be essential to monitor and thereby minimize the misuse of the facility. TSO/MON is the tool that satisfies this objective.

An important objective of Canada Life's management is the need for effective hardware/software planning, a function commonly referred to as "capacity management." TSO/MON has already proven to be essential to the capacity management effort.

The obvious advantage provided with TSO/MON is a comprehensive data base of historical TSO usage spanning up to a 13-month history, which can be easily and quickly (usually within seconds) accessed. This simplifies planning and forecasting.

What has been impressive to Canada Life's capacity man-

(Continued on Page 32)

by batch alone.

Two major features put the HP 3000 in a class by itself. The first is our state-of-the-art operating system, a Multiprogramming Executive that can manage a vast workload extremely fast. When we clocked one second of MPE activity, it handled 2,280,000 micro instructions in the central processor, 14 file accesses, seven input swaps and five output swaps.

This ability to "juggle" batch and on-line jobs lets you develop new programs on the HP 3000 while it's running your old ones. And we offer six "big computer" languages to keep your programmers happy. With COBOL, RPG, FORTRAN, BASIC, APL (Series II only), and SPL (our streamlined Systems Programming Language), you can develop the precise programs your company needs.

Virtual memory plays an important role in this performance. It gives you an almost unlimited program size by keeping the code and data on your disc, swapping only those parts that are needed in main memory. This operation is totally transparent to the user. And it's speeded up by our new 50 megabyte discs, with 5 ms seek time track to track.

The second major attribute is the HP 3000's powerful data management capability. Our IMAGE/3000 software, good enough to be named to the Datapro Software Honor Roll, puts a sophisticated Data Base Management system (1) literally in your hands. You can access files of consolidated data with our simple inquiry language, QUERY. Or use KSAM (Keyed Sequential Access Method) on our Series II to call up a series of related files. Our DEL/3000 Data Entry Library simplifies your terminal-oriented transactions.

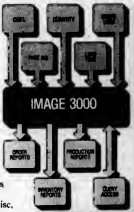
A variety of HP terminals also makes it easier to input or call up data. For instance, our new graphics terminal (2) provides auto-plots at the touch of a key. And a new printing terminal (3) keeps information flowing from the factory or warehouse.

Another "big computer" feature is fault-correcting memory on the HP 3000 Series II. If a circuit fails, the memory automatically corrects itself and stores information about the faults in a RAM. Our engineers will call up that information during routine maintenance and replace the faulty circuit.

We offer two basic systems, based on CPU speed and main memory size. They're both very easy to expand to fit your needs, with additional discs, tapes, terminals, printers and other I/O devices. And, as we manufacture virtually everything in our systems, we can give you fast, knowledgeable service on any part of them.

So why don't you give us a call? Or write to Bill Krause, Hewlett-Packard, Dept. 315, 11000 Wolfe Road, Cupertino CA 95014. Instead of a computer that does batch but can't handle on-line jobs, you could soon have an HP 3000 that does it all.

1.



2.

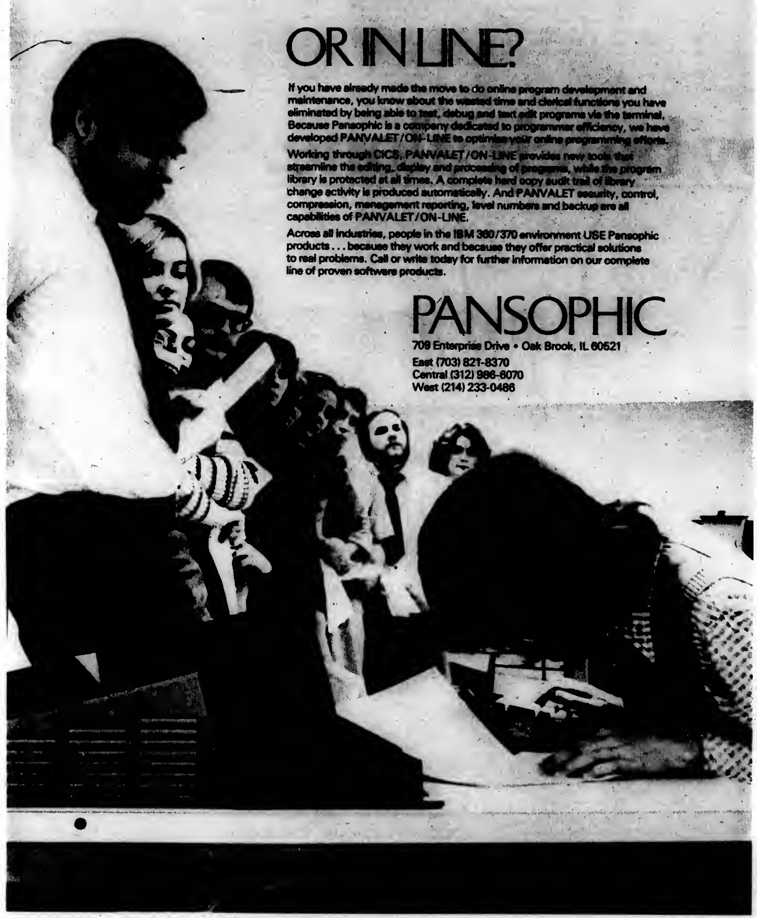
3.

HEWLETT hp PACKARD

47802HPG11

ARE YOUR PROGRAMMERS ON-LINE

OR IN LINE?



If you have already made the move to do online program development and maintenance, you know about the wasted time and clerical functions you have eliminated by being able to test, debug and text edit programs via the terminal. Because Pansophic is a company dedicated to programmer efficiency, we have developed PANVALET/ON-LINE to optimize your online programming efforts.

Working through CICS, PANVALET/ON-LINE provides new tools that streamline the editing, display and processing of programs, while the program library is protected at all times. A complete hard copy audit trail of library change activity is produced automatically. And PANVALET security, control, compression, management reporting, level numbers and backup are all capabilities of PANVALET/ON-LINE.

Across all industries, people in the IBM 360/370 environment USE Pansophic products . . . because they work and because they offer practical solutions to real problems. Call or write today for further information on our complete line of proven software products.

PANSOPHIC

709 Enterprise Drive • Oak Brook, IL 60521
East (703) 821-8370
Central (312) 986-6070
West (214) 233-0486

Holding Company Banks on On-Line Programs

RICHMOND, Va. — Increased competition within the banking community for a share of the consumer credit market has resulted in greater reliance on on-line data processing by today's modern bank. This trend is very evident at First & Merchants Corp. (F&M), a bank holding company with approximately $1.8 billion in assets and 97 branch offices.

F&M uses on-line CRT terminals to provide Visa credit authorization, to simplify the maintenance of cardholder accounts and to speed processing of sales drafts from branches, agent banks and merchants.

The on-line system for credit card processing is only one of seven major on-line applications at F&M. The others cover the banking spectrum, from demand deposit to commercial loan and corporate trust systems.

All of F&M's on-line applications were developed using the facilities provided by Task/Master, a teleprocessing monitor from Turnkey Systems, Inc.

Consumer Demand

F&M's on-line systems run in a single region of an IBM 370/158. The operating system is now VS1, with a conversion under way to MVS. This conversion is just one step F&M is taking to prepare for the increased demand for on-line banking services.

Much of this demand is expected to be consumer-related. Consumer credit is a segment of the banking business that F&M began to pursue actively when it decided to issue BankAmericards (now being converted to Visa) in 1967. F&M installed its first system for processing credit card transactions a year later.

As the use of credit cards began to mushroom, however, so did the bank's processing requirements. Since each credit card purchase is actually a form of loan to the cardholder, procedures are required to authorize purchases over a preestablished upper limit.

Under the batch system, this was done at F&M's Bank Card Center by authorization clerks who had to look up account balances manually on computer-generated listings.

The manual lookup process "was a real bottleneck," according to Clay Shelton, the senior systems officer now responsible for the overall support and development of F&M's on-line applications. "We never seemed to have enough people or enough listings."

As a result, F&M put credit authorization on-line in 1969 using 10 IBM, 2260s. "This was our first real use of the computer as more than just a bookkeeping machine," Shelton said. "It also represented a significant change in orientation for us."

Since then F&M has upgraded its terminals to Sanders Associates Model 860s and has continually enhanced the system to the point where it is today providing immediate credit authorization for over 12,000 merchants and is fully on-line with the Visa U.S.A., Inc. network for authorization involving non-F&M cardholders.

Under F&M's system, telephoned authorization requests are directed to an operator sitting at a CRT. If the request involves an F&M cardholder, it is handled locally.

If the request involves a cardholder whose account is not with F&M, it is routed to the Visa network, where a similar lookup and analysis is performed at the cardholder's bank.

Communication with the Visa network is accomplished through a Periphonics T-Comm 7 control unit that operates as a front end to the 370/158. It was the need for software support for this environment, as well as for a flexible package that would accommodate its plans for the future, that led F&M's selection of Task/Master as its communications monitor.

Len Smith, vice-president of technical services, reported that a number of factors went into the decision to acquire Task/Master. "Support for the Periphonics unit was, of course, very important to us," Smith said, "but we also looked at the stability of turnkey systems and their support for the product and both appeared to be very good.

"Task/Master was also continually being enhanced and that was important to us in light of what we saw coming down the road in on-line banking."

F&M has recently added another element to its credit card processing system, the on-line entry of sales drafts from merchants.

"Based on Visa U.S.A.'s own reports, we've always maintained one of the lowest loss rates of any bank in the country," Shelton said. "Because we're on-line we're able to implement some very tight controls and really stay on top of things."

Clay Shelton

WHO DO YOU THINK HAS HAD 20 YEARS OF EXPERIENCE IN MAKING PRINTER TERMINALS?

di/an

Here's How You Benefit From That Experience

With so many makes and models of hard-copy terminals to choose from, how can you select the system most suitable for your needs?

Let Di/An Controls help you. We've been making computer products since 1958 for industrial as well as governmental applications. For general DP as well as specialized applications. If you've recently taken an airline flight, bet on a horse, gone to the theater or attended a sporting event, chances are your ticket was processed through a Di/An printer.

Our 20 years of experience guarantees you'll receive compact, rugged, reliable and cost-effective terminals. We offer a standard product line with a variety of options including special interfaces and APL character set.

Our experienced technical, sales and applications staffs can assist you in the application of our products and in training your personnel to use them. We can also train your maintenance people, or you can use our field service organization.

When you're looking for RO, KSR and ASR hard-copy terminals with up to 1200 baud throughput, come to Di/An Controls, the experienced terminal company that's here today—and will be here tomorrow.

di/an®

Di/An Controls, Inc., 944 Dorchester Avenue • Boston, Massachusetts 02125
Tel: (617) 268-7700 • TWX No.-710-333-1732

Canadians Control TSO Misuse

(Continued from Page 29)

agement effort is the comprehensiveness of data attainable with TSO/MON compared with standard SMF. The primary reason for the increased data comprehensiveness with TSO/MON is the minimization of SMF data loss.

First, any SMF collection related data loss situations (e.g. data set fill ups) result in a loss of data, which certainly impacts all the processes using the information. TSO/MON has been of great advantage in this area in that a continual reminder message is sent to the operator notifying him that SMF data loss is occurring.

A more important factor affecting the SMF data loss problem is a result of the session termination method of measurement employed by SMF for TSO, which will normally result in a significant level of SMF data lost for TSO when a system failure occurs.

At Canada Life, in one 30-day period, a number of vendor software problems resulted in a series of system failures. The monthly totals based on TSO/MON and SMF foreground CPU time measurements resulted in TSO/MON showing 24.5 hours and SMF accounting for only 15 hours.

In other words, TSO/MON was able to capture over 9.5 hours of foreground CPU time that would have normally been unavailable through SMF because of the system failures. The impact of such a dramatic data loss situation on the planning and forecasting process is obvious.

Although Canada Life has not formally utilized TSO/-MON as a performance tool, several immediate gains were realized including the savings of more than 60K of real memory due to excessive buffer allocations.

The plan for using TSO/MON as a performance tool calls for using TSO/MON in conjunction with RMF with both systems generating data on a continual basis and reporting at synchronized hourly intervals.

When combined, the two products provide a comprehensive analysis of an MVS/-TSO complex, with RMF providing the system level MVS performance indicators (e.g. paging rates, swap rates, swap reason codes, etc.) as well as certain pertinent TSO measures, and TSO/MON providing the analysis of what is actually going on within TSO (e.g., user activity, commands invoked, programs executed, etc.).

Together, these two products provide a powerful monitoring and problem tracking system that the firm expects will greatly facilitate its daily problem tracking and tuning activities.

Ken Starke, the systems support manager, said "even though we had Morino's first MVS product shipment, we have never experienced a systems problem in our nine months of continual operation. I was able to install the product in an evening."

Starke went on to say, "The reports provided by TSO/-MON have demonstrated their value resulting from pertinence, conciseness and readability. With this information now available, we are able to better manage the TSO network at the end user level in terms of the workload as well as the system performance level."

Savings Banks Backed

LEXINGTON, Mass. — A nine-module package for savings banks equipped with IBM System/34s or other small systems using RPG-II has been developed by McCracken Computer, Inc.

Although they form an integrated system, the modules are also available separately, the company said.

The modules include processing for general ledger, securities, budget, accounts payable and financial modeling. Cost center profitability, new loans, deposit analysis and safe deposit box accounting modules complete the collection, according to a spokesman.

The entire package, including operator training and implementation support, costs about $25,000; individual modules vary in cost according to their complexity, the spokesman said from 4 Militia Drive, Lexington, Mass. 02173.

'DYL-260' Gains Full Interface With IMS, DL/1

ENCINO, Calif. — Dylakor Software Systems, Inc. has introduced a full-function interface between Dylakor's DYL-260 report writer and extended utility package and IBM's Information Management System (IMS) — and its DL/1 subset.

The linkage lets DYL-260 users set up, load, update and retrieval operations against IMS or DL/1 data bases and is therefore far broader in its capabilities than the previously introduced, and still available, "retrieval only" interface, a Dylakor spokeswoman said.

Both interfaces work with DL/1 Entry DOS/VS, DL/1 DOS/VS, IMS/VS and IMS/360, she noted, and they support all types of DL/1 access methods including Hidam, Hdam, Hisam, Shisam and Shsam.

DYL-260 rents for $98/mo. Beyond that, the full-function IMS-DL/1 interface costs $110/mo, while the "retrieval only" linkage costs $80/mo. Lease and purchase plans are also available, Dylakor said from 16255 Ventura Blvd., Encino, Calif. 91436.

APL COURSES FOR BUSINESS APPLICATIONS

Tailored to your APL implementation.

TEXTS • STUDENT WORKBOOKS • TEACHING AIDS

Numetrix Limited (416) 868-6013
3 Church Street, Suite 602,
Toronto, Ont. M5E 1M2

ACQUISITION WANTED

Boston-based computer terminal lease/service Company would like to acquire Sales-oriented company with Fortune 1000 customer base. Our strong suits are administrative and financial expertise, plus excess cash flow from operations and lines of credit. Qualified organizations are invited to participate in our explosive growth — We double revenues every two years, and earn 10%+ profits. Contact PHILLIP K. CIOLFI, Pres.

SELECTERM, INC.
2 AUDUBON RD./WAKEFIELD, MA 01880 (617)246-1300

Available Immediately For

SHORT TERM LEASE

370/138 370/148 370/145

3330's and OEM 3330's

360/30 360/40 360/50 360/65's

Greyhound Phoenix ICA's

CALL US COLLECT

United States		
Austin	Ron Geil	(512) 451-0121
Boston	Tom Ryan	(817) 272-8110
Chicago	Jerry Smith	(312) 298-3910
San Francisco	Dave Hyland	(415) 283-8980
International		
Canada	Don Maunder (Toronto)	(418) 366-1513
Mexico	Andres Contreras	(905) 543-6850
Eurasia (U.S. inquiries)	Don Haworth (Dallas)	(214) 233-1818
U.K./Europe	Joe Gold (Geneva)	(022) 81-27-54
Austro-Asia	John Hallmark (Dallas)	(214) 233-1818
Non-IBM:		
UNIVAC or)	John Hallmark (Dallas)	(214) 233-1818
CDC only)	Don Haworth (Dallas)	(214) 233-1818

GREYHOUND
COMPUTER CORPORATION
GREYHOUND TOWER, PHOENIX, ARIZONA 85077

DG Eclipse Fortran 6?

Better yet, CFOR, a user-oriented programming language, is now available for your ECLIPSE. CFOR is easy to learn and implement, and is translated to DG's fast-executing FORTRAN 5. Intelligible control flow and rational syntactic cosmetics lead to "GOTO-less" structured programs which are easy to write, read, debug and modify. A commercial field variable data type extends CFOR to data processing environments while retaining the computational, multi-tasking, interactive qualities of FORTRAN.

Contact David N. Langley

FINNING

FINNING COMPUTER SERVICES LTD.
555 Great Northern Way, Vancouver, B.C., V5T 1E2, (604) 872-7474

Looking for software to sell?

We have a new (fieldtested) software package for *all* Cobol-users. It is in the $3,000 area and tailored for mass selling on the international level.

We are now looking for local representatives in various countries on an exclusive right basis.

Interested?
Then send your or your organization's request together with
- Territory wished
- Size of organization
- Sizes of sales/technical force
- Track record of software selling and maintaining (system utility type)
- Other information concerning you or your organization.

To: CW Box 1371
797 Washington St.
Newton, MA 02160
U.S.A.

Added Protocol Urged

Datagrams Seen Boon to Network Users

By Ronald A. Frank
CW Staff

WASHINGTON, D.C. — Datagrams will allow users of public data networks to send individual packets into the network, addressed so that they will be delivered to the proper receiving terminals, according to John Wheeler, a standards expert with Xerox Corp.

Speaking at a recent symposium on computer networking at the National Bureau of Standards, Wheeler said a datagram protocol should be added to the CCITT X.25 standard, since it provides only for virtual calls and permanent virtual circuits.

Under the present X.25 format, the only way a terminal at one port of the network can communicate with a terminal at another port is by establishing a virtual circuit between the two ports and then carrying on a two-way conversation.

The datagram concept would give the network user more flexibility since all packets would be independent and not associated with a continuous stream of data as they are with a virtual circuit, he explained.

Ongoing Debate

A continuing debate has developed regarding the need, economics and practicality of a datagram service in packet-switched networks, Wheeler said. Most overseas postal, telephone and telegraph authorities and some common carriers maintain that datagram service should not be offered, but on the other side, a strong position has developed that datagram service is urgently needed. The U.S. advisory group for Subcommittee 6 of the International Standards Organization (ISO) has consistently supported this view, he said.

A recently approved U.S. contribution supports a datagram service because of new data communications applications which require transaction processing. In this case, the messages are independent and can arrive in any sequence. It would be wasteful to go through the process of setting up a virtual call just to send one message, Wheeler said.

Other real-time applications in data acquisition and process monitoring involve redundant data transmissions, and a few missing messages might better be ignored because the most recent measurement is the only important one. These applications could probably benefit through the use of datagram service instead of virtual circuits, he said.

Datagrams would also be important when two separate networks in the packet-switched mode are interconenected. The two nets could both be public data nets operating in different countries or one may be a public data net and the other a private one.

If virtual circuits alone were used for the interconnection between nets, two virtual circuits would have to be established. All traffic between terminals would pass through a single interconnecting link and all packets would have to be arranged in proper order before they could be forwarded, because of the rules of virtual circuit protocols, he explained. A problem in either virtual circuit or the one interconnecting link would cause a loss of transmission.

But if a datagram protocol were used, a large number of interconnecting inks could be used between the two networks. A datagram entering a network could use any one of a number of interconnecting links to provide communications between two terminals. Further, there is no requirement for datagrams to be arranged in sequence so the delays of transmission would be reduced considerably, he said. And the failure of a few interconnection links would have almost no effect on the transmission of datagrams.

Efforts are continuing within the Consultative Committee on International Telephone and Telegraph (CCITT) and ISO to develop a workable datagram protocol. Among the issues to be discussed are the need to maintain a reasonable flow control function at the network interfaces, the problems of packet sizes, methods of identifying datagrams and the possible need for delivery confirmation or nondelivery notice by the network, Wheeler said.

Commercial Union Sets Sites On SNA-Based National Net

BOSTON — Commercial Union Assurance Companies (CU) has begun implementing a network using IBM's Systems Network Architecture (SNA) to provide service to its agents and customers.

This spring, CU automated Massachusetts automobile underwriting and claims processing and this reportedly became the first insurer to use the IBM 3790 communication system for this line of business. The company plans to extend the system to its offices in more than 30 cities across the country during the next two years.

The company's SNA network currently operates with a 370/158 in Boston and 12 remote sites. Each site has a 3791 controller and 3277 Model 2 CRTs. The network also includes 3793 keyboard printers and 3288 line printers, a spokesman said.

The net, all under Synchronous Data Link Control (SDLC), operates on private lines at 2,400 bit/sec in full-duplex mode. The Model 158 includes 4M bytes of storage and includes a 3705 front end with the IBM Network Control Program (NCP). The CPU operates under Vtam and CICS/VS.

"Now, when a transaction — be it premium, claim or endorsement — is submitted, a manual search through several paper files is no longer necessary to find out if the transaction is valid," according to Charles Purrelli, CU senior vice-president.

File Integration

The system has enabled CU to integrate into one data base the policy files, endorsements and other policy changes, claims, claims arising , and financial and statistical information. With integrated files in the computer, one entry on a CRT terminal automatically updates all other files for the policyholder, including all business and financially related files. Consequently, up-to-the-minute policyholder data can be instantly retrieved and displayed on the terminal's screen.

"The result has been a reduction in errors, paperwork, clerical and outside service bureau costs — helping us to hold the line on expenses," Purrelli said. "CU is the first major personal lines writer in Massachusetts to process its business in-house, simultaneously integrating the use of distributed processing in branch offices with

(Continued on Page 34)

Unitech Terminals Top-Rated

DELRAN, N.J. — Users of batch and remote job entry terminals rate Unitech, Inc. devices higher than others, according to a survey conducted by Datapro Research Corp.

The survey drew responses from 296 users who had a total of 1,990 installed terminals. On a scale of 1 for poor to 4 for excellent, the Unitech terminals received a score of 3.5 for overall performance.

Sixteen makes of terminals were rated by five or more users. Ranking just below Unitech were Data 100 Corp. (3.3); Datapoint Corp.(3.3); Digital Equipment Corp. (3.3); Four-Phase Systems, Inc. (3.2); IBM (3.2); and Burroughs Corp. (3.1).

Users also selected equipment by Harris Corp. (3.1); CMC (3.0); Mohawk Data Sciences Corp. (3.0); Control Data Corp. (2.9); Univac (2.9); Entrex, Inc. (2.8); Sycor, Inc. (2.8); Honeywell Information Systems, Inc. (2.7); and Comterm Ltd. (2.6).

The majority of users (55%) operated their equipment over private-line systems while 41% used dial-up facilities. Most users had their terminals operating on point-to-point links (69.5%) with only 2% involved with multipoint applications.

Binary synchronous protocol was utilized by 70.5% while 9% transmitted in Ascii mode and only .7% said they used Synchronous Data Link Control (SDLC). Of those who used emulation with their terminals, IBM Hasp was most mentioned with 171, the IBM 3780 was next with 129 and the CDC User 200 had 57 responses. And 54 users said more than one emulator was being used with their terminals.

The most popular transmission speed was 4,800 bit/sec (43.7%) while 24% said they operated at 9,600 bit/sec and 21% said their speed was 2,400 bit/sec.

Dedicated batch was the most prevalent application with 71.2% while general DP was 16.3% and data entry scored 15.8%. The Ebcdic transmission code was mentioned by 73% while Ascii was favored by 20% of the respondents. Most of the host CPUs were IBM 370s, according to the survey.

The IBM 3775 terminal was mentioned by 31 users while the Data 100 Model 78 received 30 responses ... The Data 100 Model 76 was used by 20 respondents, while 19 mentioned the Harris 1200 series and the IBM 3780.

The survey is included in a report titled All About Batch/RJE Terminals which is available for $12 from Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Terrific? Or Traumatic?

Computerworld is planning a special report in March on the use of data communications terminals. Application stories and tutorial articles written from the user's viewpoint will be featured in this report. Articles should be typewritten and limited to four to five double-spaced pages. Please send them by Jan. 27 to Ronald A. Frank, c/o Terminal Report, Computerworld, 797 Washington St., Newton, Mass. 02160.

Data Net Helps Optimize Firm's Operations

MINNEAPOLIS — When a company shifts from centralized to geographically dispersed data-entry operations, an efficient data communications network is key to the success of the operation.

As data-entry operations have been upgraded at International Multifoods Corp.,, increasing amounts of data have been transmitted back to the Minneapolis headquarters of the firm which runs operations that include Mister Donut and Boston Sea Party restaurants and Hickory Farms cheese shops.

"Processing data from a corporation as diversified and as geographically dispersed as Multifoods would be very difficult without high-speed data communications," according to Gordon Multz, director of corporate DP.

Data transmitted from remote locations has been an increasing share of the firm's DP workload since it upgraded to a CMC 1800 system from the CMC Division of Pertec Computer Corp.

Using the Telebatch features, the 1800 operates like an IBM Hasp 360/20 workstation to transmit and receive data from IBM 2780-compatible terminals, 360/370 CPUs and other mainframes operating with Binary Synchronous protocol.

Using Ebcdic code and an EIA 232C interface with Bell 201 or equivalent independent data sets, the Telebatch system can transmit at 2,400, 4,800 or 9,600 bit/sec depending on the application.

Multifoods currently has links with affiliates in Minneapolis; Little Chute, Wis.; Chicago and Montreal. The Wisconsin and Chicago locations have CMC 3 systems linked to the central DP site by private lines operating at 9,600 bit/sec. The Minneapolis site uses its CMC 3 for general accounting data and also has an NCR 8200 for order processing. These two systems transmit data to the 1800 at 4,800 bit/-sec over dial-up facilities.

International Multifoods' data-entry operation is described in a story on Page 40.

The Montreal affiliate has its own DP operation and sends summary data transmission to the Minneapolis DP center once each month over dial-up 2,400 bit/sec lines using an IBM 3747 terminal.

The Minneapolis, Chicago and Wisconsin sites transmit data daily to the 1800 where it is processed on the Burroughs B4700 mainframe and reports are transmitted back the following morning.

The remote sites have the capability for simultaneous data entry and data transmission.

The company is currently evaluating the possibility of expanding its network to Central and South American sites, but current line costs are still considered prohibitive, according to Lavon Ginter, operations analyst.

Insurance Firm To Expand Net

(Continued from Page 33)

centralized computing facilities," he added.

"Besides being more accurate, service is faster," he added. "For example, in Massachusetts we have cut the time it takes to issue a check for claims under $2,500 to minutes for walk-in customers and one day by the mail. Previously, it often took days or weeks using manual processing.

"We intend to automate personal lines nationwide — homeowners and automobile insurance — plus processing and underwriting services for some commercial lines. Worker's compensation would certainly fit this category," according to Lawson Swearingen, chief executive officer of Commercial Union U.S.A.

According to Purrelli, CU decided to adopt distributed — as opposed to centralized — DP because computing power and information are required in the field locations where decisions are made.

$17 Million Project

"CU is committed to using advanced state-of-the-art automation techniques to improve its service and reduce expenses," executive vice-president Howard Ward said. To underscore that point, he said the company's board of directors has approved a three-year $17 million project for automation.

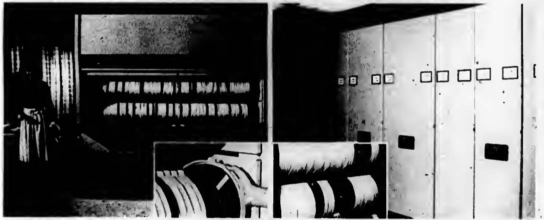
The new system enables operators of CRT terminals at field locations to inquire into and display policyholder information, write policies or update customer records through direct links with a 3791 communications controller at the branch. The controller, in turn, is linked via private lines to the central 370/158 in CU's Boston headquarters.

Once the entire transaction is validated, the data is transmitted to the CPU. After processing in Boston, where billing and rating are done automatically, the new policy is printed at the field location for delivery to the policyholder.

If endorsements or policy changes are being made, the 3790 can retrieve appropriate segments of the policy master record from the local control unit or the main computer and then can compare the segments to operator-entered data to complete the transaction.

How to choose between the two best tape filing systems you can buy.

Sperry Remington makes your life a little more complicated. To make it a little easier! By giving you a choice of handsome, convenient, efficient computer tape filing systems. One of them will fit your needs best, and help you get the Boggles out of your tape file system.



Lektriever® 110 System lets you locate your computer tape files directly adjacent to your computer for maximum convenience. This compact, easy-to-use, automated tape file features unique T-Bar tape carriers that let you store hanging-type computer tapes where they're available in seconds. And you can store literally hundreds of tapes with the Lektriever 110. Over 1200 1" tapes in only 34 square feet of floor space. For convenient, efficient, secure, point-of-use tape filing, the lockable Lektriever 110 is the obvious choice.

T.M.
THIS IS A BOGGLE.
It could be the bug in your tape file system

Elecompack System V makes high-volume computer tape filing easy and economical. And saves you a tremendous amount of space, as well. This fully automated shelving system uses 46% less floor space than conventional shelves to store the same amount of tapes. And they're all available at the touch of a fingertip. Plus, System V gives you something no ordinary shelves can: complete lockable security. For high-volume tape filing with space-saving efficiency, your best choice is Elecompack System V.

Send me literature
☐ Lektriever 110 System ☐ Elecompack System V
☐ Have salesman call

NAME__________
COMPANY__________
ADDRESS__________
CITY__________
STATE__________ ZIP______

Lektriever 110 and Elecompack System V —two great ways to unBoggle your computer tape filing. The choice is yours—call your Sperry Remington dealer now or write to

SPERRY UNIVAC
OFFICE EQUIPMENT
PO BOX 500
BLUE BELL, PENNSYLVANIA 19422
SPERRY UNIVAC IS A DIVISION OF SPERRY RAND CORPORATION

PTS-100 Gets Boost To Back 32 Terminals

NORWOOD, Mass. — Raytheon Data Systems Co. has doubled the main memory of its PTS-100 programmable terminal systems and increased the number of operator stations that can be supported.

Previously, the terminal was offered with a maximum of 64K bytes of main memory. It is now being supported with up to 128K bytes, which allows the PTS-100 systems to support up to 32 1,920- character terminals compared with a previous limit of 24, according to a spokesman.

Raytheon now offers 480-, 960- and 1,920-character screens, he noted.

Designed to operate in emulation of IBM 3270 equipment, PTS-100 systems support both local and remote processing and feature enhancements designed to reduce communications line time during interactive transactions, Raytheon said.

The system has the capacity to handle up to 20 line printers and can support any of four keyboards, including typewriter, operator's console, data entry and keypunch.

A PTS-100 remote enhanced emulator system with 32 terminals is priced at $2,899 on a one-year lease the vendor said from 1415 Boston Providence Tnpke., Norwood, Mass. 02062.

Teleprinter Helps Micro Maker Support Product

LEXINGTON, Mass. — Part of being in the semiconductor business is selling support tools to help make the product easier to use, according to David F. Millet, product manager at NEC Microcomputers here.

The primary support tool offered by NEC Microcomputers is the PDA-80 program development aid, a self-contained system that expedites the development of both software and hardware. A key part of that system is the General Electric Terminet 30 teleprinter.

The microcomputer development system has two functions — writing software and then debugging it. The PDA-80 enables the user to write software for the computer, write the programs and convert them from human-readable to machine-readable form and then debug them.

That's where the teleprinter comes in. "When someone wants to develop software for a computer of any sort, he must have some integrated computer device that has a human interactive interface," Millet said.

"With that, the software can be written and edited and once created in a human-intelligent fashion, converted to something that is machine-intelligent."

"The Terminet 30 was the most cost-efficient answer to our problem. We looked at several dot matrix printers, but the print quality wasn't as good as the GE printer."

Modem Monitor Has LED Display

KING OF PRUSSIA, Pa. — A compact signal-display device that reportedly can be placed in-line between data sets and data communications terminals to provide a means of isolating failures has been introduced by Sorbus, Inc. The unit, which monitors without disrupting communications activity, was designed for data communications suppliers, data terminal users and service organizations.

Plugged in-line, the pocket-size monitor uses LEDs to provide constant status display of seven key signals on the EIA RS-232 25-pin business machine interface. The signals monitored include Transmitted Data, Received Data, Request-To-Send, Clear-To-Send, Data Set Ready, Carrier Detect and Data Terminal Ready, the firm said.

The Traffic Light

Named the Traffic Light, the monitor also has a spare LED circuit that can be used to show the status of any other signal.

The unit, which costs $89, is covered by a one-year warranty on both parts and labor. Sorbus is at 150 Allendale Road, King of Prussia, Pa. 19406.

Rare bird.

An editing CRT that's ideal for transaction processing.

Lower software costs. Easier programming.

System builders say our Model 1200 Editing Terminal is ideal for transaction processing. We agree.

The Model 1200 makes programming easier because it tells the programmer (and the host computer) the status at the terminal. Communications strap setting, printer errors, operator mode key setting, and more.

The Model 1200 also cuts down on host computer loading by automatically setting modified data "tags," whenever a field is updated, so the host computer can request only modified fields, and skip thousands of needless compare operations.

To further lighten the load on the host computer, the Model 1200 has programmable send keys that let the program regulate the amount of data returned to the computer as terminal loading varies.

More productive operators.

Thanks to a 9 x 12 character matrix, the Model 1200 has crisp, clear, strikingly sharp characters. So operators see their work better and make fewer mistakes.

Data entry is incredibly accurate due to field attributes like low intensity, numeric only, blink, and inverse video.

Editing is fast and easy, too. Single keystrokes insert and delete characters and lines.

All our standard goodies. Only $1383.

A big, 12-inch screen, 128-character ASCII set, upper and lower case, 15 cps Typamatic repeat on all keys, and a 24-line display are standard. So is our exclusive No Hassle toll-free 800 number for service. One call gets you service. Where you need it. When you need it. World-wide.

So go ahead. Get a CRT terminal that's specifically designed for transaction processing. Perkin-Elmer's Model 1200 Editing Terminal.

For more information, write Perkin-Elmer Data Systems Sales and Service Division, 106 Apple Street, Tinton Falls, New Jersey 07724 or telephone toll-free 1-800-631-2154

PERKIN ELMER

Quantity 75

BR Modular Terminal Built to Handle EFT

TRUMBULL, Conn. — A modular system of on-line data terminals to handle teller transactions and other operations in savings institutions has been introduced by Bunker Ramo Corp.'s (BR) Information Systems Division.

Thrift System 90 was designed to provide increased flexibility and modularity of equipment and software for users in their present operations and for future internal or external electronic funds transfer (EFT) requirements, BR said.

The system features a variety of CRT terminals and printers for use by tellers, back office personnel and platform officers; a minicomputer for branch office processing and terminal and communications control; and a software package called Thriftran, which controls the interaction between terminal users and the functions they perform, the company said.

In addition to instant updating and interrogation of central account records, the system provides advanced functional features using the Thriftran software.

The branch minicomputer is program-loaded either by a host processor or locally via a diskette. Communications with host processors (IBM, Burroughs, Univac, Honeywell, etc.) is at speeds ranging from 1,200- to 9,600 bit/-sec, with a dial-up fallback facility available.

When communications or the host processor are down, branch transactions can be carried on normally under control of the branch minicomputer. Distributed processing and recording of all transactions expedites end-of-day teller procedures at each branch, the spokesman said.

The minicomputer control unit reportedly can tie other on-line terminal equipment into the DP system of a user institution for EFT operations.

Thrift System 90 includes the minicomputer-programmable control unit, single or dual floppy disk storage device, CRT teller terminal, passbook printer, transaction card reader, customer security keypad for personal identification numbers, administrative terminal and printer.

A typical system including four teller terminals to serve eight teller stations, passbook printing capability and a control unit costs about $15,000. First deliveries are slated for this year from BR, 35 Nutmeg Drive, Trumbull, Conn. 06609.

Overseas Telex Now Available To Wiltek Users

NEW YORK — Western Union International, Inc. (WUI) has completed an interconnection agreement to provide international Telex service to Wiltek/Wilcom domestic communications users. This makes international Telex service available on a store-and-forward basis to Wiltek subscribers without any additional equipment.

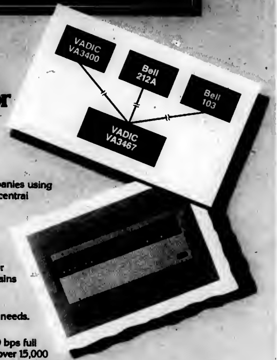
Wiltek provides high-speed data communication terminals and Wilcom, a computer switching service located in Norwalk, Conn. Domestic transmission uses dial-up telephone facilities at speeds of 1,200 bit/sec.

However, for international Telex service, Wiltek/Wilcom subscribers previously were required to access the domestic Telex/TWX networks at standard 66- or 100 word/min speeds using traditional terminals. Now, Wiltek customers can transmit their international Telex traffic directly from the Wiltek terminals at 1,200 bit/sec to the Wilcom computer for relay to WUI's Autosafe system, according to the agreement.

Autosafe is computerized store-and-forward Telex service that offers verification of delivery, automatic redialing service and a cablegram conversion option, WUI said.

An automatic delivery verification report is transmitted to the Wiltek center the next morning, confirming that the overseas messages have been transmitted and including the time of delivery for Telex messages, WUI added.

Charges for the WUI transmission are standard international Telex rates. Wiltek is charging Wilcom subscribers a flat $50 per month for the automatic relay capability.



Dear Ma:

The crystal ball is right. Vadic's new microprocessor modem is a VA3400, a 212A, and a 103!

Imagine, Ma, a modem that time sharing houses, and companies using dial-up lines for data communications, can standardize on at the central computer site. With a single phone number for all asynchronous ports from 0 to 1200 bps, if desired.

By ingeniously building in a microprocessor, Vadic's new VA3467 automatically recognizes the calling modem, be it a VA3400, a 212A or a 103, and responds accordingly. All this on a PC board including direct connect (no need to rent your DAA's) for $850 or less! The VA3467 even tests itself continuously, plus contains all of Vadic's famous diagnostics.

The VA3467 is field expandable, too. You can start with just a VA3400 and later add the 103 or 212A depending on your network needs. That's what firmware does for you.

You just can't seem to catch up, Ma. Vadic invented the 1200 bps full duplex modem (the VA3400) 'way back in 1973, and has delivered over 15,000 to more than 1,000 customers worldwide. Now, Vadic has leapfrogged ahead with the TRIPLE modem. By the way, Ma, Vadic has just published a booklet comparing the VA3400 to the 212A in 14 critical areas. Better send for one. It's free.

Your independent thinking son,

Alexander Graham Jr.

PS: Vadic has shipped over 150,000 modems to date.

vadic

THE VADIC CORPORATION
222 Caspian Drive, Sunnyvale, CA 94086
Tel: (408) 744-0810 TWX: 910-339-9297

Member of IDCMA

In Credit Operations

Oil Firm Uses CRT Net to Personalize Service

SAN FRANCISCO — A network of CRT terminals has been credited with making Union Oil Co.'s retail credit operations cost-effective and successful.

"Consumer credit on a national scale grew up with the computer," according to G.H. O'Leary, general manager of Union Oil's retail credit-card operations. "Today, computers have helped automate most customer purchases, billings and transactions, but occasionally someone has a problem and needs the help only another person can give.

"To provide this assistance, we established a terminal network to link eight teams of customer service representatives with the central computer and files that contain information on over three million accounts."

Each team consists of 10 persons. A team member working directly with a customer and account information uses one of 83 Honeywell Series 7700 VIP terminals connected directly to a Honeywell large-scale Model 66/40 system.

Each of the eight teams is assigned approximately 375,000 accounts, preselected on the basis of account number clusters. Two additional teams — one working with customers that have special collection problems and the other handling lost or stolen credit cards — also have terminals.

A customer file typically starts when a credit application for a charge card is approved and entered into the data base. New accounts are forwarded to Union Oil's issuance section, where operators use six Model 7760 CRT terminals to feed information into the CPU.

Updated information and account changes are also fed directly into the mainframe from Honeywell terminals and added to one of the nine MSU0451 mass storage units for later use.

Delivery tickets from dealers are processed in San Francisco at the retail credit card center using a Recognition Equipment; Inc. optical reader that scans account numbers and amount of sale, bar codes the tickets and sorts according to billing cycle. At the same time, dealer information is recorded on magnetic tape to assist in balancing dealer statements.

Most of the application programs have been developed by Union Oil's systems and programing staff using Honeywell file management techniques. During conversion last year from a Honeywell Model 2070 to the newer large-scale system, many programs and systems were restructured and updated, O'Leary said.

Terminal Transactions

Masks for the terminal screens, as well as a special character-compression techniques to maximize space for data storage and usage, have been developed internally.

The Honeywell Model 66/40 computer system and 89 CRT terminals include 256K words of MOS main memory, a Datanet 6624 front-end network processor, nine tape units, 10 on-line disk units, 1,200 line/min printer, card reader and card punch and an array of optical reader and other data input devices.

A CRT that costs more but actually costs less.

At $907, our Perkin-Elmer Model 1100 CRT Terminal has been the price-performance leader in the CRT business for almost a year. Recently, some CRT makers cut their prices to a few dollars below ours.

Don't be fooled. The Model 1100 still costs less. Here's why.

Program debugging takes less time.

You'll save the few extra dollars you spend for our CRT the first time a programmer uses it for debugging a program. The secret? A feature called Transparent Mode, which displays everything coming down the line – including control characters – and helps solve the most complicated host computer and communication link problems in seconds.

Operators make fewer errors.

You'll save money day after day with the Model 1100. Thanks to a 9 x 12 character matrix, the Model 1100 has crisp, clear, strikingly sharp characters. So operators see their work better and make fewer mistakes.

The Model 1100 also has a hooded display to eliminate reflection and end eyestrain. The display is right at eye level, too, which means no bending, no neck problems, and less fatigue.

All our standard goodies.

A big 12-inch screen, 128-character ASCII set, upper and lower case, Typamatic repeat on all keys, and a 24-line display are standard. The same goes for our exclusive No Hassle toll-free 800 number. One call gets you service. Where you need it. When you need it. Worldwide.

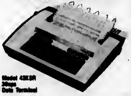
The Perkin-Elmer Model 1100. Feature for feature, it still costs less.

For more information, write Perkin-Elmer Data Systems Sales and Service Division, 106 Apple Street, Tinton Falls, New Jersey 07724 or telephone toll-free 1-800-631-2154.

Quantity 75

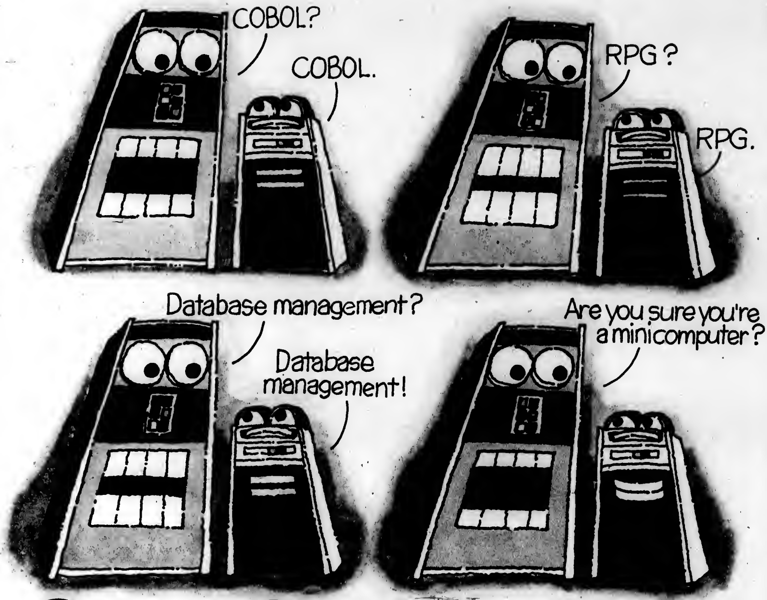
PERKIN ELMER

TELETYPES®



New and Reconditioned
Models 28 • 32 • 33 • 35
40 • 43

FEDERAL Communications Corporation
11105 Shady Trail #107
Dallas, Texas 75229 U.S.A.
(214) 620-0644 TELEX 732211


COBOL?
COBOL.
RPG?
RPG.
Database management?
Database management!
Are you sure you're a minicomputer?

Our software speaks your language.

Now the largest manufacturer of interactive minicomputers offers the broadest spectrum of commercial software tools: ANSI '74 COBOL, DBMS, SORT, RPG, QUERY, MULTI-KEY ISAM, and more.

That means even better Datasystem functionality in commercial applications. Better because you get:

- great performance in multi-task environments with our new, easy-to-use, interactive, full-function COBOL
- advanced multi-key ISAM data management with our new RMS-11
- fast, versatile report generation with our RPG II
- super fast sorting of data files with our new SORT-11
- advanced data base facilities with our CODASYL-compliant DBMS-11
- quick easy access to data, plus flexible, selective reporting with our new COBOL-compatible DATATRIEVE-11

What's more, we've dropped our prices. And that means even better Datasystem price performance. For details, contact the nearest Digital office, or Digital Equipment Corporation, Business Products Group, MK-2/H32, Merrimack, N.H. 03054. European headquarters: 12, av. des Morgines, 1213 Petit-Lancy/Geneva. In Canada: Digital Equipment of Canada, Ltd.

digital

Expect Enhanced Operations

Texans on Drives: The Bigger the Better

DALLAS – The County of Dallas expects to expand its data base and enhance the overall performance of its DP operations by installing larger capacity disk drives.

A total of 32 Memorex Corp. Model 3650 spindles are on order and are being installed in two phases. These 317.5M-byte units are replacing older Memorex 200M-byte drives.

When all of the higher capacity devices are in place, the county will have a data base capacity of 10.16G bytes, up from the previous 7.2G-byte limit.

The expanded storage capacity will allow the county's DP center to keep pace with a rapidly growing population and the corresponding rise in requirements for community-related services, according to the country's director of data services, Charles Collier.

The Data Services Office supports a wide range of activities such as the sheriff's department, criminal justice system, real and personal property tax rolls and voter registration.

Installation Phases

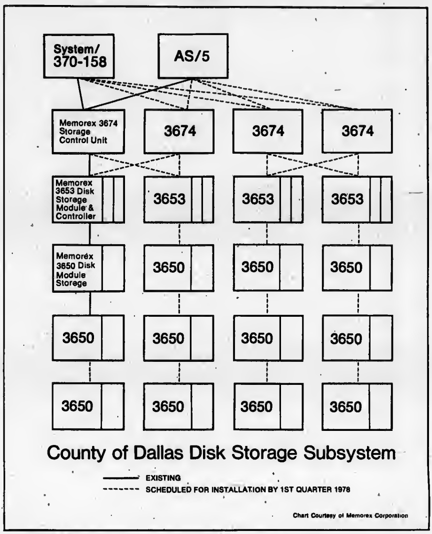
In the first phase of the installation, completed last October, two 3650 disk storage modules with two 317.5M-byte spindles per module, one 3653 disk storage module and controller (two spindles plus controller) and one 3674 storage control unit (SCU) were installed.

The second phase of the installation, scheduled for this quarter, will consist of the balance of the 32 spindles plus three additional 3674 SCUs. A portion of the phase two modules will contain Memorex's optional fixed read/write head feature. This will reportedly provide zero access time for 1.14M bytes per spindle and will be used by the county primarily to store critical and frequently addressed data.

"Installation of the new storage equipment went very smoothly," according to Hank Lipscomb, operations manager for the Data Services Office. "The 3650s were installed during one and a half shifts and they came up clean.

"Since the 3650 modules can emulate 100M-byte Memorex 3670 drives and 200M-byte Memorex 3675 drives, we've had no problems in converting to the 317.5M-byte devices," he added. "This was particularly important to us because we're operating both 200M- and 317.5M-byte drives during changeover."

The Memorex 3650s are being shared between the county's two mainframe computers, and IBM 370/158 and an Itel Corp. AS/5. The use of Memorex controllers enhances configuration flexibility and data availability in this type of installation, Lipscomb said.


System/ 370-158
AS/5
Memorex 3674 Storage Control Unit
3674
3674
3674
Memorex 3653 Disk Storege Module & Controller
3653
3653
3653
Memorex 3650 Disk Module Storege
3650
3650
3650
3650
3650
3650
3650
3650
3650
3650
3650
3650
EXISTING
SCHEDULED FOR INSTALLATION BY 1ST QUARTER 1978

County of Dallas Disk Storage Subsystem

Chart Courtesy of Memorex Corporation

For instance, the 3653 module and controller is string-switchable under program control or manually between the two 3674 SCUs (the county has ordered the optional string switch feature).

The 3674s, in turn, are channel-switchable between the two CPUs. Thus, data stored on any 3650 module in a string are accessible by both of the CPUs. In the event one of the 3674s is unavailable, access can be maintained through the second SCU.

In a typical 370 environment, a 3650 subsystem may be attached in any one of three ways: via the Integrated Storage Control (ISC) on a 370 or via the Memorex 3674 SCU or IBM 3830-2 to block multiplexer channels. At the County of Dallas, the 3650s are attached to the block multiplexer channels of both the 370/158 and the AS/5.

"The extensive diagnostic capabilities of the 3650 subsystem was an important consideration in our selection of Memorex,," Collier said. "Because we provide services to agencies like the sheriff's department and the criminal justice system, we can't afford to have our equipment down. If there's a problem, we have to identify it fast and correct it."

Memorex began shipping its 3650 products in the second quarter of 1977 for preproduction evaluation. The County of Dallas installation represents Memorex's initial production unit installation, he added.

Tired of being last on the routing list?

Subscribe yourself.

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

Operators Work in User Areas

Key-to-Disk Setup Eases Data Entry Growth

MINNEAPOLIS — "We are processing very large volumes of data for our company's remote and head-office user areas — orders, shipments, payments and so forth — on a daily basis. If we didn't have an efficient data-entry system and high-speed data communications, many of the remote locations would probably require their own on-site processing capabilities and would have to be equipped accordingly," according to Gordon Multz, director of corporate DP for International Multifoods Corp. here.

Multifoods operates outfits bearing names like Mister Donut, Boston Sea Party restaurants and Hickory Farms cheese shops. The corporation also serves a wide range of other consumer-oriented functions.

All of the business data generated by these activities flows into a Burroughs B4700 medium-scale system at Multifoods' corporate headquarters here, where operations are performed in batch mode. Data-entry functions for this centralized system are performed by a CMC 1800, manufactured by Pertec Computer Corp.'s CMC division.

The CMC 1800 is cable-connected to keystations in various user departments throughout the headquarters building, where data is entered into the CMC Distributed Data Entry System for subsequent input to the B4700. The 1800 also communicates over high-speed private and dial-up lines with three CMC 3 Keyprocessing systems, an NCR Corp. 8200 CPU and an IBM 3747 data converter at remote sites in the U.S. and Canada.

International Multifoods' communications setup is described in a story beginning on Page 34.

"Twenty-four keypunch devices and operators were required to do our data entry work back in 1972, when we started looking at key-to-disk equipment," Lavon Ginter, operations analyst, recalled. "We began a systematic search for the key-to-disk vendor best suited to accommodate our particular needs, narrowed the choice to four contenders and did a careful evaluation of each, including sending our operators out to actually try each vendor's system with live data.

"We chose the CMC 5, the most current system offered by CMC at the time, and installed two duplexed systems, since our needs exceeded the disk and keystation capacity of a single system. In 1975 we replaced the CMC 5s with the 1800. We felt that a single key-to-disk system would reduce supervisory problems.

"We also felt that the 1800 would accommodate our expanding data communications workload with virtually no degradation as far as our data-entry activities were concerned," Ginter explained.

Shift in Philosophy

More than just a change of hardware, the shift from keypunches to video display keystations represented a fundamental change in data-entry philosophy. The 24 keypunch operators had constituted a department by themselves — an adjunct to DP, totally separate from the user departments whose data they handled.

"With the installation of the CMC 5s, we began breaking up this department and moving the operators into the user areas where the data originates. At first, most of them were very hesitant about leaving the group because of the close-knit relationship in the keypunch department. But after they had tried working in the user areas, most of them were delighted with the change. They became involved with the user departments, discovered there was more to Multifoods than just the DP area, and many found previously unavailable opportunities for promotion," Ginter noted.

"We've found, too, that they tend to make fewer errors now, and they work more productively, probably because they can relate to the information they are working with, seeing it as real prices or real inventory items rather than just numbers on a source document," she observed.

In a review of the company's move to distributed data entry and its effect in terms of personnel requirements, Harry Donaghy, corporate DP manager, noted "in March 1973, two months after the CMC 5s were installed, we had 24 operators and 24 keypunch units. Just four months later, we were doing the same volume of work with 18 operators and 18 keystations. Now, we are performing those same functions with just 12 operators and 12 keystations and the volume of work they handle is about 10% greater than it was in March 1973.

"In all," he continued, "we're now using a total of 18 keystations in our Minneapolis building, but six of these are handling new applications we didn't have back in '73.

"In comparing the cost of our past and present approaches, we found that the elimination of just one keypunch opertor was enough to recover the lease cost difference between the 24 keypunches and the key-to-disk system," he added.

How to jump into key-to-disk, without giving up your

Granted, key-to-disk equipment does good things for data preparation in high-volume applications.

However.

This is one big jump that is best accompanied by a little foot-dragging. Because, in your enthusiasm for the things key-to-disk can do, you may forget what it can't do: read and punch cards.

And the punched card is still very much alive. Particularly as a turn-around document. But the useful unit record is also a pain in the processor for most key-to-disk systems. Leaving you with an awkward I/O problem, and possibly some dissatisfied using departments, too.

But what can you do? Hire, and train, two staffs of operators? One for keypunch, the other for key-to-disk? Double up on equipment? Establish two different work-flows?

Don't.

Instead, call us. Ask to see one of our key-to-disk-compatible interpreting data recorders. It works *with* your key-to-disk system to give you multi-media capability. You can use it for I/O. Or flip a switch and slip into off-line keypunch mode. Each unit combines keypunch, verify, interpret and reproduce functions so you can have a lot of scheduling flexibility without getting a lot of machines.

The best of both worlds? Why not? Use the coupon to find out just how easy it is, or call 800-523-5948.

Decision Data Computer Corporation
100 Witmer Road
Horsham, Pa. 19044
215-674-3300

☐ Send me more information on your key-to-disk-compatible data recorders.

☐ Have your representative call for an appointment.

Name ________ Title ________

Company ________

Address ________

City ________ State ________ Zip ________

Phone ________

We ☐ own a key-to-disk system made by:
☐ are considering a key-to-disk system made by:

☐ CMC
☐ Consolidated Computer
☐ Data 100
☐ Other________
☐ Entrex
☐ Four-Phase
☐ GTE/IS
☐ Inforex
☐ Mohawk
☐ Univac

DECISION DATA®
COMPUTER CORPORATION
makes computing cost less

STRUCTURED METHODS, INC.
127 EAST 59TH STREET · NEW YORK 10022 · 212 753-4450

☐ Please enter ______ registration(s) for: ____________________
____________________ (Course, City and Date) ____________________, and bill me/bill my company.

☐ Please send me information about the following courses:
____

Name(s): ______________________________________
Title(s): ______________________________________
Company: ______________________________________
Address: ______________________________________
City: ____________________ State: ____________ Zip: __________
Phone: ____________________

Computerworld

FIRST CLASS
PERMIT NO. 2131
NEW YORK, N.Y.

BUSINESS REPLY MAIL
No Postage Stamp Necessary if Mailed in the United States

POSTAGE WILL BE PAID BY

STRUCTURED METHODS, INC.

127 EAST 59TH STREET
NEW YORK, N.Y. 10022

STRUCTURED METHODS
PRESENTS

The Structured Caravan...

SEMINAR SCHEDULE

COURSE	DAYS	FEE	JANUARY 1978	FEBRUARY 1978	MARCH 1978
Structured Caravan	1	$50*	5 Wash DC 9 Toronto 11 Chi. 13 S.F. 16 L.A. 18 Houston 20 Boston 23 N.Y.		
Introduction to Techniques and Tools of Structured Systems Development	1	175	30 Chi.	22 S.F.	15 Wash. DC 20 Toronto
Managing Systems Development. A Structured Approach	2	325	31-Feb. 1 Chi.	23-24 S.F.	16-17 Wash. DC 21-22 Toronto
Structured Analysis	2	325	30-31 S.F.	6-7 Chi. 27-28 Wash. DC	6-7 Boston 13-14 L.A. 27-28 Toronto
Structured Design	3	475		1-3 S.F. 8-10 Chi.	1-3 Wash. DC 8-10 Boston 15-17 L.A. 29-31 Toronto
Structured Analysis Design Workshop	5	625	30-Feb. 3 Wash. DC	6-10 Toronto 13-17 Boston 27-Mar. 3 L.A.	6-10 S.F. 13-17 Chi. 27-31 Houston
Structured Design Programming Workshop	5	625	30-Feb. 3 Chi.	6-10 Wash. DC 27-Mar. 3 S.F.	6-10 Toronto 27-31 L.A.
Software Reliability	5	625	30-Feb. 3 L.A.	13-17 Chi. 27-Mar. 3 Toronto	6-10 Wash. DC 13-17 S.F. 27-31 Boston
Structured Programming for COBOL Programmers	2	325		23-24 Wash. DC	20-21 S.F.
Infotech/Jackson Design Technology Workshop	10	1400	16-27 Chi. ** 30-Feb. 10 S.F. **	27-Mar. 10 Houston **	6-17 L.A. ** 13-24 Boston **
Data Base and the Organization	3	475	16-18 S.F.	13-15 Wash. DC	20-22 Houston
Data Base Package Analysis & Selection	3	475	9-11 Chi. 23-25 Wash. DC	13-15 Toronto	13-15 Houston 20-22 Boston
Data Base in a Distributed Processing Environment	2	325		27-28 Boston	6-7 Chi. 20-21 S.F.
Data Base Management Systems for Minis—A Comparative Analysis	3	475			1-3 Boston 8-10 Chi. 22-24 S.F.
Systems Design in a Data Base Environment	2	325		6-7 S.F. 27-28 Chi.	27-28 Wash. DC
Designing Effective Data Bases	3	475		8-10 S.F.	1-3 Chi. 29-31 Wash. DC
Transaction Oriented Processing	2	325		27-28 Toronto	6-7 Houston 27-28 Chi.
Transaction Processing Control Systems—A Comparative Analysis	3	475			1-3 Toronto 8-10 Houston 29-31 Chi.
Data Dictionary/Directory Systems—Management Overview	1	175		24 Boston	13 N.Y. 31 Wash. DC

*Entitles registrant to $50 credit towards any Structured Methods, Inc. product or service
**Weekdays only

DISCOUNT POLICY

Groups of 3 or more—10%

Payment in advance of 21 days for courses beginning on or before Feb. 15, 1978—10%

Registration for consecutive courses listed below reduces fees to the following:

Introduction to Techniques and Managing Development: A Structured Approach	$475
Structured Analysis and Structured Design	625
Data Base in Distributed Processing Environment and Data-Base Management for Minis	625
Systems Design in Data Base Environment and Designing Effective Data Bases	625
Transaction Oriented Processing and Transaction Processing Control Systems	625

Fees include all materials, continental breakfast, coffee breaks and lunch

Structured Methods, Inc., 127 East 59th Street, New York, N.Y. 10022 212 • 753-4450

. . . coming soon to an oasis near you—the dates are in the schedule to the left. Meet the people from Structured Methods, the emerging leader in software development education. Bring along your questions—or just your curiosity—but make sure you attend!

The morning program of the Caravan will consist of three talks: **The Role of Structured Analysis in the System Development Life Cycle**—by Raymond Eisenstark of Structured Methods—**Developing Systems in a Data Base/Data Dictionary Environment**—by Hal Uhrbach of DBD Systems—**Structured Methodologies for Software Development**—by Andrew Pinkowitz of Structured Methods. The afternoon program will allow small groups of attendees to participate in each of three intense one-hour clinics. These clinics will deal with the topics presented in the morning session. The fee for the Caravan, including lunch and all materials is $50 . . . and we issue a $50 credit towards any other Structured Methods product or service.

To register, or to receive more information you can call us collect at 212 • 753-4450, or you can fill out the coupon.

STRUCTURED METHODS, INC.
127 EAST 59TH STREET · NEW YORK 10022 · 212 753-4450

☐ Please enter__________registration(s) for__________
(Course, City and Date)

☐ Please send me information about the following courses:

Name(s):
Title(s):
Company:
Address:
City: State:
Zip: Phone:

☐ Payment Enclosed ☐ Bill Me ☐ Bill My Company

Charge my: ☐ Visa/BankAmericard ☐ Master Charge
(Interbank No.—above your name)

Card No.:
Expiration Date:
Signature:

Focus on Accounts Payable

NEW YORK — A course detailing the development of a computer system for accounts payable will be sponsored by American Management Associations (AMA) here on Feb. 22-24.

The three-day seminar will discuss making the initial feasibility study for a system, setting up the systems team and advisory committee, establishing project work phases and anticipating a company's cash flow, a spokesman said. The course will also cover audits, guarding against in-house fraud, internal money-management controls and microfilm retrieval systems, he stated.

Instructors for the course will be John C. Storck Jr., a principal with Storck Associates, and Charles L. Swenson, vice-president of Management Science America, Inc.

The AMA said it recommends the meeting for accounts payable managers, accounts supervisors, project leaders, systems analysts, controllers and programmers. Additional courses will be held in Chicago on March 6 and in Atlanta on April 3.

Registration fees are $460 for AMA members and $530 for nonmembers. Team fees (for three or more managers attending the same meeting) cost $390 for AMA members and $450 for nonmembers. Additional information can be obtained from AMA headquarters, 135 W. 50th St., New York, N.Y. 10020.

MIC to Sponsor Seminar On Data Entry Concepts

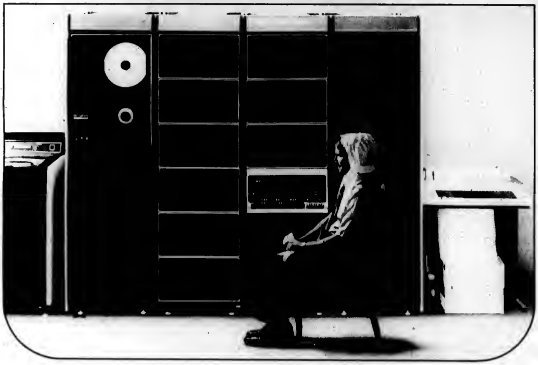
CHERRY HILL, N.J. — A three-day seminar involving the concepts of data entry will be held here at the Cherry Hill Inn on Feb. 27-March 1 by Management Information Corp. (MIC).

The course will present such topics as data entry system applications, control techniques, personnel communication and motivation, operator rating procedures and improving data entry productivity, a spokesman said. How to get the most out of keyboard equipment and establishing keying procedures will also be covered, he explained.

The meeting will concentrate on the subject of data entry through discussions with the various instructors who will attempt to provide the participants with solutions to common problems involved with system implementation, he added. MIC said it recommends the seminar for managers, supervisors, lead operators and technical support personnel.

The course will be repeated at the same location on May 22, Sept. 11 and Nov. 13, the firm said. Registration fees are $395 for subscribers of MIC publications and $425 for nonsubscribers. Additional information is available from MIC at 140 Barclay Center, Cherry Hill, N.J. 08034.

Does waiting for 11/70 Memory make you feel like Whistler's Mother?



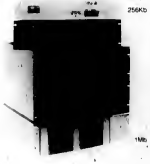
Reflective? Resigned? Reflecting back on when you first ordered your additional 11/70 memory? Resigned to the fact you may age months before you can expand your computer's memory capacity?

If this is your picture .. then it's time for another arrangement. Like off-the-shelf delivery of our ECOM® 70 system. (We've been doing it for a long time).

The ECOM 70 composition is perfect. Two chassis configurations are available for greater flexibility. Memory capacity from 128Kb to 4 Megabytes in 128Kb increments.

A remote programming feature with reconfiguration controls to easily select address range ... plus a downgrade switch to totally disconnect the ECOM 70 memory without hardware modifications, for ease of fault isolation. And to complete the scene, all programming plugs, I/O cable and manuals are provided to speed field installation. Factory service contracts are available in major cities.

We can put you in an even better mood about PDP 11/70 memories when it comes to the price. Write Trendata/ Standard Memories, 3400 West Segerstrom Avenue, Santa Ana, CA 92704, or call (714) 540-3605. TWX 910-595-1596.



For an instant quotation call The Memory Man toll free: (800) 854-3792, (in California) (800) 432-7271.

STANDARD MEMORIES
has grown into a new name

Applied Magnetics
Trendata

ECOM® 70 is a registered Trade Mark of Standard Memories
PDP-11/70, DEC and various model designations are recognized registered Trade Marks of Digital Equipment Corporation

Bits & Pieces

Bentley Sets Courses On Management

WALTHAM, Mass. — A series of courses focusing on the theory and practice of management techniques and developed in cooperation with American Management Associations' Extension Institute will take place at Bentley College here.

The courses will concentrate on general management; managerial finance and control; and management and the computer, a spokesman said.

Each of the courses is certified. Upon successful completion of six courses, a Certificate in Business Management will be awarded. Classes begin on Jan. 30 with registration fees ranging from $175 to $195 per course.

Information and registration materials can be obtained from the registrar's office at the Bentley College Center for Continuing Education, Beaver and Forest Streets, Waltham, Mass. 02154.

Elpac Extends Ugly Warranty

SANTA ANA, Calif. — Elpac Power Systems has announced an increase in its standard product warranty on all linear power supplies manufactured after Jan. 1.

The warranty on that firm's power supplies, nicknamed "uglies," will cover a period of two years instead of one year, according to a spokesman.

Elpac is located at 3131 S. Standard Ave., Santa Ana, Calif. 92705.

HIS Level 64 Rent Fees Grow

WALTHAM, Mass. — Honeywell Information Systems, Inc. has announced a 5% increase in commercial rental charges for its line of Series 60, Level 64 medium-scale computers.

The increases were effective Jan. 1 for new business and will take effect on April 1 for existing contracts, a spokesman said. Affected are the models 64/20, 64/30, 64/40, 64/50 and 64/60 central systems, he stated.

Correction

The National Computer Centre Ltd. publication *Computer Installation Contracts* is not available from the Hayden Book Co., Inc. as reported [CW, Dec. 5]. Instead, the book is available for $4, prepaid, from NCC Publications, Oxford Road, Manchester, England.

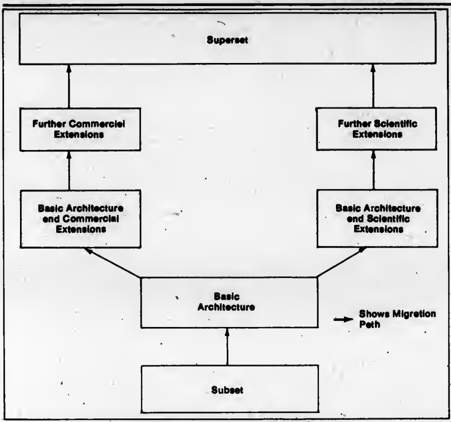

Superset
Further Commercial Extensions
Further Scientific Extensions
Basic Architecture and Commercial Extensions
Basic Architecture and Scientific Extensions
Basic Architecture
Shows Migration Path
Subset

Figure 2. Upward-Compatible Family

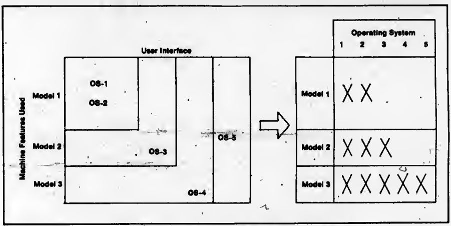


Figure 3. Family of Compatible Operating Systems

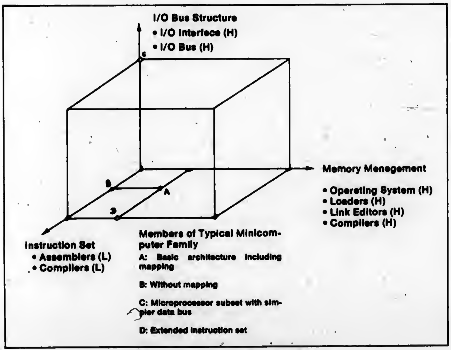


Figure 4. Computer Characteristics Space

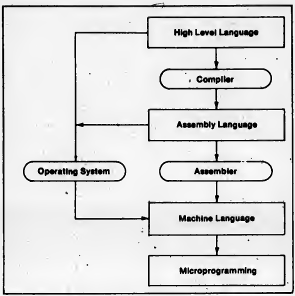


Figure 1. Levels of Computer Usage

Family Approach Eases Use of Old Software On New Hardware

By Dileep P. Bhandarkar
Special to CW

The concept of a family of compatible computers is gaining popularity in the computer industry. This approach is practical — and inevitable — for manufacturers as well as users.

From the user standpoint, the primary advantage is the ability to use old software and equipment with new computers. The manufacturer gains from a standard product line by sharing development and sustaining costs over a wider range of products.

In order to understand the logical constraints on compatibility, it is important to understand the difference between architecture and organization. The architecture of a computer is its conceptual structure and functional behavior as viewed by the programmer.

A given architecture can be implemented in numerous ways. Different organizations correspond to different physical implementations based on appropriate internal data and control structure.

A user may view a computer at various software levels, as shown in Figure 1. The architecture seen by a programmer at any or all of these levels can be standardized.

A high-level language programmer views a virtual machine represented by the definition of that language his interface with the operating system. From this viewpoint, he is not concerned about implementation at all the lower levels.

To the Assembly language programmer, standardization is at the Assembly language level. Strictly speaking, at this level the actual machine language formats are irrelevant.

However, most Assembly language programmers also deal with the machine language representation and therefore require standardization of the actual binary machine codes. Therefore, members in a typical computer family differ only in their micro architecture.

Compatibility from the programmer's viewpoint implies the ability to transfer source programs without modification. The above has to be qualified in terms of whether such movement is totally compatible or upward- or downward-compatible. Compatibility reduces or ideally eliminates conversion costs when programs are moved across a family of machines.

Generally, the machine language level is chosen. If full upward/downward compatibility is desired, a common instruction set, input/output architecture and memory architecture must be defined. This requires careful planning of the entire family.

Most computer families are only upward-compatible. Models line up in a hierarchy where a machine at a higher level can perform all the func-

(Continued on Page 48)

Tektronix 4020 Series

When you make your next investment in terminals...

Get something to show for it.

The new Tektronix 4020 Series may be your first long-term terminal investment. It's a series of refresh terminals designed to fit your needs today... and your growth picture tomorrow.

For example: The 4025 terminal expands from smart alphanumerics... to forms ruling... all the way to graphics. You start with basics like expandable memory. Familiar typewriter keyboard with complete, easy editing. Scrolling. Easy-on-the-eyes green display with variable brightness.

Now or later, add forms ruling. You can construct separate on-screen workspace and monitor areas that scroll independently. You can recall complex forms with a single key.

Finally, you can add Tektronix graphics. The 4025's 34-line deep screen is the perfect proportion for graphics. Our PLOT 10 Easy Graphing software makes bar charts, pie charts and histograms easy to produce. Alphanumerics, graphics and forms can be positioned anywhere on-screen, in any combination.

Our companion 4024 provides secondary growth... from alphanumerics to forms. So you can closely plan and manage your terminal investment with optimum cost control.

Ask your local Tektronix Sales Engineer for a personal demonstration. We'll show you a priced-right, expandable approach to your input and display needs, with the promise of proven reliability and worldwide Tektronix support. The new 4020 Series. It's an investment you can grow with. Even when you're too busy for words.

Tektronix, Inc.
Information Display Group
P.O. Box 500
Beaverton, OR 97077
(503) 638-3411
Tektronix Datatek NV
P.O. Box 159,
Badhoevedorp
The Netherlands

OEM information available

Copyright © 1977, Tektronix
All rights reserved

Tektronix
COMMITTED TO EXCELLENCE

Compatibility Ties Software, New Hardware

(Continued from Page 45)

tions of those below, but not vice-versa.

Such a hierarchy of models might have multiple models at one level that are not compatible with each other, but are compatible with everything below. Subsets of the basic architecture might also exist. A typical scenario is shown in Figure 2.

The architecture of a computer can be viewed along three major dimensions: instruction set, memory management and I/O.

Changes or rather additions to the basic instruction set have a minor impact on users and the manufacturer. Assemblers and compilers have to be modified to use the new instructions and the Assembly language programmer has to use them in his new software to exploit the new features.

All other system software continues to run, but does not use the new instructions. Additions that are typically made are floating-point instructions or byte string manipulation instructions.

I/O architecture, especially, must be standardized. In fact, manufacturers have found that different implementations of a given I/O architecture leads to a proliferation of I/O interfaces.

Thus, not only I/O architecture but also I/O bus structure needs to be standardized.

Memory management changes cause widespread problems. Drastic changes in memory management techniques affect operating systems, compilers, loaders and link editors. The user also has a different view of his memory space.

Software compatibility means more than a standard machine architecture. High-level language specifications need to be standardized. A family of (upward) compatible operating systems is required.

The user interface to the operating system must be standardized. Operating systems and languages designed for specific applications should be permitted as long as their incompatibility is clearly understood by both the manufacturer and the customer. There is always a trade-off between standardization and environment specific optimization.

Operating system compatibility has two aspects: the ability to run on any machine in the family and the user interface. If a computer family has one standard machine architecture, it should be possible to run any operating systems on any processor model.

However, if the family has members with only upward-compatible architectures, then operating systems will run only on higher members of the family. Such is generally the case where lower models do not support memory mapping.

In addition, lower level operating systems will not effectively utilize new features of higher machine members.

A family of operating systems must provide an upward-compatible user interface. This allows users to migrate to large systems with greater ease.

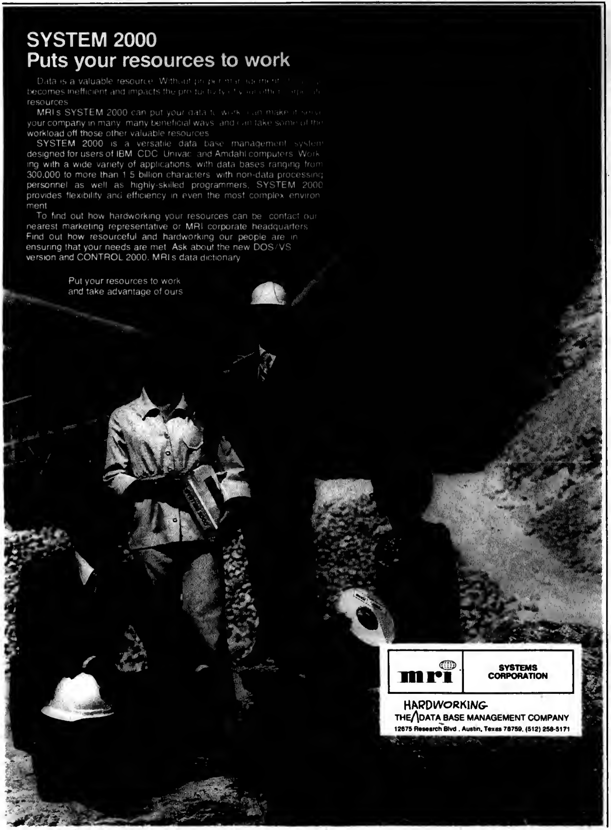
Figure 3 shows the characteristics of a family of operating systems. OS-1 may be a simple minimal system while OS-2 has more elaborate internal software functions (e.g., more intelligent scheduling or resource allocation algorithms).

OS-3 provides more user invoked functions and needs additional machine architectural features. OS-4 represents a similar extension. OS-5 uses the same machine features as OS-4 but extends the user interface.

The ultimate end user needs a further level of compatibility at the applications software level. The end user needs to see a uniform solution to his problem. For example, the same logical file structure should be used across several applications. The end user must be able to evoke a given function in a uniform fashion regardless of the system he is running on.

A computer characteristics space can be constructed where each one of the physical or logical parameters represents a dimension. A simplified space that does show the most salient dimensions is shown in Figure 4.

Bhandarkar is an engineer with Digital Equipment Corp. in Maynard, Mass.



SYSTEM 2000
Puts your resources to work

Data is a valuable resource. Without proper management, it becomes inefficient and impacts the productivity of your other corporate resources.

MRI's SYSTEM 2000 can put your data to work, can make it serve your company in many, many beneficial ways, and can take some of the workload off those other valuable resources.

SYSTEM 2000 is a versatile data base management system designed for users of IBM, CDC, Univac and Amdahl computers. Working with a wide variety of applications, with data bases ranging from 300,000 to more than 1.5 billion characters, with non-data processing personnel as well as highly-skilled programmers, SYSTEM 2000 provides flexibility and efficiency in even the most complex environment.

To find out how hardworking your resources can be, contact our nearest marketing representative or MRI corporate headquarters. Find out how resourceful and hardworking our people are in ensuring that your needs are met. Ask about the new DOS/VS version and CONTROL 2000, MRI's data dictionary.

Put your resources to work
and take advantage of ours.

mri SYSTEMS CORPORATION
HARDWORKING
THE DATA BASE MANAGEMENT COMPANY
12675 Research Blvd., Austin, Texas 78759, (512) 258-5171

Expects to Halve Payroll Time

Metal Firm Gets First IBM System/34

By Esther Surden
CW Staff

ST. PAUL, Minn. — The first user of IBM's System/34 small business system, introduced last April, expects to cut in half the time it took his firm to do payroll on a card-oriented 3/10.

Union Brass and Metal Manufacturing Co. decided to make the switch from the 3/10 to the 34 because "we were starting to expand our utilization of the equipment" and the 3/10 could not handle the expected workload, according to Michael A. Poston, the firm's president.

The system was installed in late December and is in the process of becoming fully operational, he said.

Union Brass' DP department surveyed the systems available and decided the 34 could give the company what it needed, most importantly a cardless system and more speed, which were the firm's highest priorities.

"We also wanted to get into more sophisticated work" in the inventory control and production scheduling areas, Poston noted, adding the 34 should afford the company that opportunity.

Poston envisions an on-line system hooked into the plant that will allow workers who have completed work on a given part to insert a card into an IBM 5230 unit and transmit that information instantly into the computer.

The production management people will then be able to tell from the system what procedures are left to be done and how many man-hours it will take to complete them.

Control over inventory will also be enhanced using the system. A bill-of-materials explosion will produce requirements for an inventory of about 350 kinds of parts, castings and product items, according to Theodore A. Brockman, controller.

Another application for the system will be sales analysis, which the firm was in the process of expanding on the 3/10. "With the 34, we will be able to get more sophisticated sales analysis," Poston said.

But the most important application, and

(Continued on Page 56)

PDP-11/70 Users Gaining Free Remote Diagnostics

MAYNARD, Mass. — Users of Digital Equipment Corp.'s PDP-11/70 large-scale minicomputer will soon be able to take advantage of remote diagnosis of system malfunctions as a program to phase in the equipment needed to detect those malfunctions gets under way, according to a DEC spokesman.

Remote diagnostic equipment will be supplied with all new PDP-11 systems. Present users of the systems can opt to receive the units on the anniversary of their field service agreement.

The remote diagnostic capability is being installed at no charge. to users, DEC emphasized, although users will have to provide a dedicated, voice-grade telephone line and a Data Access Arrangement. There are currently about 850 users under the service contract, out of the total 2,000 PDP-11/70 users, DEC said.

The Remote Computerized Diagnosis is composed of three elements: a DEC Electronic Console, which is a microprocessor-controlled unit that performs system diagnostic procedures and communicates with the remote host computer; the Service Response Line, a 24-hour, toll-free telephone service that makes the initial determination of whether to attempt remote diagnosis; and the Digital Diagnosis Center, where the host computer, communications equipment and engineering staff are located.

The Electronic Console is used in place of the regular PDP-11/70 front panel, allowing users to initiate operating commands through the system terminal, a spokesman explained. When a system malfunctions, the user dials the toll-free number to contact the Service Response Group, which then arranges for remote diagnosis and contacts the appropriate field service office to schedule a sevice call.

Configuration files are used to determine proper parameters and diagnostic procedures for specific systems.

The console also allows the remote host system to log problems for each installation so trends can be identified and flagged.

The Diagnosis Center can arrange for performance evaluation at no charge when the system is not being used, DEC added.

All remote accesses to the system are user-controllable through a key-operated switch on the console and are indicated by a displayed legend, the firm said from headquarters in Maynard, Mass. 01754.

Talking to Mini Makers — Part II

Vendors Say They're Working To End Documentation Beefs

By Esther Surden
CW Staff

Aware that documentation has been a bone of contention between minicomputer users and their vendors, many mini and small business systems vendors are presently revising their methods of preparing it.

Poorly written documentation was one complaint mini users made in replying to a recent survey on minicomputers [CW, Aug. 29]. A random sampling of vendors replied to that complaint.

Documentation must be improved and is being improved, a spokesman for Digital Equipment Corp. contended, because if a user doesn't understand the documentation and thinks there is a bug, that user is going to call field service unnecessarily.

DEC is making a concerted effort to improve its documentation for its users. "We put a senior writing supervisor into Harvard on a nine-month sabbatical to research the question of what constitutes good technical documentation," he said.

The results of that study produced a method of assessing the manuals the firm produces. The attitude at DEC now is that "the documentation is as important a part of the product as the code," he said.

In July, Computerworld *asked readers to tell us what they thought about minicomputers by filling out and returning a survey form. The results of that survey, published in August and September issues, showed support and maintenance were areas of great concern to users.*

This is the second article in a series that will fill users in on what vendors say they are doing to alleviate some of the problems in those areas.

A vendor "has to do an adequate job in documentation" and in "being specific as to what the software will or won't do," a

(Continued on Page 56)

When we installed our first minicomputer disk system, we talked a lot about RELIABILITY.

4000 systems later, our customers tell the story.

Reliability. We do more than just talk about it. We deliver it. That's one of the main reasons we're now the world's largest independent supplier of minicomputer disk storage systems.

We've delivered more than 4000 systems since we installed our first one in 1971. That's strong evidence of hardware reliability and broad product acceptance.

There's a lot more to the story. Behind our reliable hardware is a reliable company that keeps delivery commitments, provides total software support and responds quickly to customer service requirements. Ask our customers.

We make good disk drives work better through *Extended Emulation.*™ This powerful approach adapts software to emulate the CPU manufacturer's operating systems—while still taking full advantage of the unmatched performance offered by our disk system. Whether you need disk storage for mini or micro, you need to know about the important benefits *Extended Emulation* can provide.

The diverse applications for our disk systems are regularly described in our quarterly newsletter, *The Bit*. If you'd like to be on our complimentary mailing list, use the coupon today. We'll send you the current issue. And if you need product data, or help with a specific application, contact the System Industries sales/service office nearest you.

System Industries
an equal opportunity employer

525 Oakmead Parkway, P.O. Box 9025, Sunnyvale, CA 94086
(408) 732-1650, Telex: 346-459

☐ **Please add my name to your mailing list for *The Bit*.**
Send product data on the follow disk systems:
☐ **2.5 MBytes** ☐ **10 MBytes** ☐ **300 MBytes**
Name ________________
Company __________ Position __________
Address ________________
City ______ State ______ Zip ______
☐ My need is urgent. Have an applications specialist phone me today: (____)________ ext. ____

For Wide-Ranging Broadcasting Firm

In-House System Eases Commercial Scheduling

By Ann Dooley
CW Staff

BISMARCK, N.D. — All of Meyer Broadcasting Co.'s advertisement scheduling and business functions are being run on its in-house business system, which has helped the company gain control of a complex and fast-moving business, according to its president, William Ekberg.

In terms of numbers, Meyer Broadcasting's listening audience is not large; geographically, however, it covers five states and two Canadian provinces, giving it the widest ranging daytime coverage in the U.S.

And with three television stations, three FM radio stations, three AM stations and two cable TV systems, automation is essential to the company, Ekbarg believes. "I don't know how we could get along without a computer anymore," he said.

Meyer Broadcasting uses an IBM System/3 Model 12 for its cable TV billing, product and sales analysis, accounts receivable, general ledger, payroll and accounts payable. But its most critical job is scheduling the radio and TV commercials.

An advertiser may want a specific time slot or a varying one, so the system must be flexible as well as accurate, Ekberg said. The 3/12 has been programmed so it can rotate a commercial vertically — so it runs at different times — and horizontally — so it runs on different days each week.

Horizontal scheduling "is a better buy than if the message ran at 7 p.m. every Wednesday for seven weeks — the people who watch the Wednesday night movie would see it every week for seven weeks and the people who don't watch the movie would never see the message," Ekberg said.

The system can rotate the ads automatically — a task nearly impossible to do manually with 600 to 700 weekly spots, according to Ekberg.

The system also indicates what spots have already been sold, what is available and what the advertiser's priorities are. Further, it produces Meyer Broadcasting's program log weeks in advance. If an interruption for a special broadcast occurs and a message has to be rescheduled, the system reschedules the entire log.

The small system also prints a confirmation sheet showing which commercials have been aired. In addition, it prints out advertiser contracts that detail the value and number of all daily spots.

The three TV stations are operated in a mother station/satellite mode, according to Ekberg. KFYR in Bismarck is the mother station; all national advertising as well as network programing and the first half of the noon, 6 p.m. and 10 p.m. news and weather are broadcast and fed straight through to the other stations.

The system is therefore responsible for that share of ad scheduling to all the stations, although the second half of the news programs and their commercials are handled separately by each station.

Two AM radio stations in Montana use IBM System/32s in stand-alone operations that aren't connected to the System/3 in Bismarck.

Meyer Broadcasting first began using data processing in 1966 with an IBM 402. As its needs became more complex, it upgraded from the 402 to a System/3 Model 6, then to a Model 10 and finally to its present Model 12 installed about a year and a half ago.

More Autonomy

At the time Meyer Broadcasting automated, there were few specialized data services, so it decided to build its own system. Now it is happy with its added flexibility in producing reports and generating new data, according to Ekberg.

"When you work with a data servicer, you are more or less locked into the services it can provide you. We wanted to do some things our way," he said.

One extra feature is the system-generated sales report, which gives national and regional spot sales access to a whole block of time. Allowing two days for adjustments, the last five days are frozen and the time is given over to local advertisers. This has resolved conflicts at the sales level, according to Ekberg, and was easy to do because of the controlled in-house environment.

One reason the company chose IBM as its vendor was its availability. There aren't a lot of different computer companies in this area, Ed Kautzman, head of DP operations, noted. But the service has been very good even with the long distances, he added.

Meyer's 3/12 system includes dual programming, 80K memory, dual disk drives, five CRTs and telecommunications between the TV stations.

"Our next step is to go on-line in all our applications," Ekberg said. All keypunching will soon be eliminated and all the input will be via CRTs, he added.

Real-time information will give Meyer Broadcasting the ability to immediately know where it stands at all times in its commercial scheduling, Ekberg said.

'He Dropped the CPU!'

WHEREVER YOU SOFTWARE WIZARDS
HAPPEN TO BE,
YOU CAN TALK TO DATA GENERAL RIGHT NOW.

Call right now. And talk to key managers in Systems Engineering. They can tell you about Data General from your point of view. Because they're software professionals like yourself. They'll tell you how Data General has managed to become the fastest growing minicomputer company in the world. Growing at the rate of 42% per year. Growing so fast that we now have national opportunities in major U.S. and Canadian cities for Software Support Specialists. Specialists who can provide pre- and post-sale software support on a national basis to the field sales force and to Data General customers. You'll be responsible for proposals and presentations, systems software installations and customer software development.

Your background should include a minimum of 2 years experience in one or more of the following areas: assembly language programming; distributed networks and systems; OS and data base systems development and modification; commercial applications development; experience with DGC equipment using RDOS, AOS or INFOS is a plus.

When you call, you'll hear about the great opportunities, advancements, promotions, competitive starting salary, bonuses, car allowance, tuition and relocation assistance, insurance, challenges and possibilities. All this from the company that's the growth story of the industry. The company that's gone from sales of $1 million to over $254 million in just nine years. And the company that's sold and installed over 44,500 computers in 45 countries around the world. That means you've got to move as fast as we're moving.

Data General

An equal opportunity employer M/F.

If your Software Interests range beyond field software support, ask about our opportunities in software R & D, documentation, technical support, advanced development, etc.

Opportunities exist in the following areas:

New Haven, CT
Hartford, CT
Wellesley, MA
Cambridge, MA
Nashua, NH
Providence, RI
Worcester, MA

To apply for one of the above locations, call Julian Garmil, Regional Systems Engineering Manager, collect at (617) 235-6171, or send your resume, including salary history, in confidence to him at Data General Corp., 888 Worcester Rd., Wellesley, MA 02181.

New York City, NY
Rochester, NY
Buffalo, NY
Blue Ball, PA
Philadelphia, PA

To apply for one of the above locations, call John Kostiw, Regional Systems Engineering Manager, collect at (212) 557-1122, or send your resume, including salary history, in confidence to him at Data General Corp., 144 E. 44th St., New York, NY 10017.

McLean, VA
Metro DC

To apply for one of the above locations, call Mark Splaver, Regional Systems Engineering Manager, collect at (703) 893-0910, or send your resume, including salary history, in confidence to him at Data General Corp., 1757 Old Meadow Rd., McLean, VA 22101.

Palo Alto, CA
San Francisco, CA
Seattle, WA
Denver, CO

To apply for one of the above locations, call Jim Ralalo, Regional Systems Engineering Manager, collect at (415) 321-8010, or send your resume, including salary history, in confidence to him at Data General Corp., 2445 Faber Pl., Palo Alto, CA 94303.

Van Nuys, CA
Los Angeles, CA
Santa Ana, CA

To apply for one of the above locations, call Al Scura, Regional Systems Engineering Manager, collect at (213) 973-0401, or send your resume, including salary history, in confidence to him at Data General Corp., 2221 Rosecrens Ave., Suite 204, El Segundo, CA 90245.

Indianapolis, IN
Dayton, OH
Minneapolis, MN
Schaumburg, IL

To apply for one of the above locations, call Ron Pipe, Regional Systems Engineering Manager, collect at (312) 885-0505, or send your resume, including salary history, in confidence to him at Data General Corp., 1111 Plaza Dr., Schaumburg, IL 60195.

Raleigh/Durham, NC
Birmingham, AL
Baton Rouge, LA
Charlotte, NC
Ft. Lauderdale, FL
Knoxville, TN

To apply for one of the above locations, call Brad Hebert, Regional Systems Engineering Manager, collect at (404) 325-3181, or send your resume, including salary history, in confidence to him at Data General Corp., 1639 Tullie Circle, Suite 128, Atlanta, GA 30329.

Our Level 6 Minicomputers: modular hardware, modular software, all under one umbrella.

Now one Honeywell minicomputer can let you do a lot of different jobs that once took separate minicomputers and other systems to do.

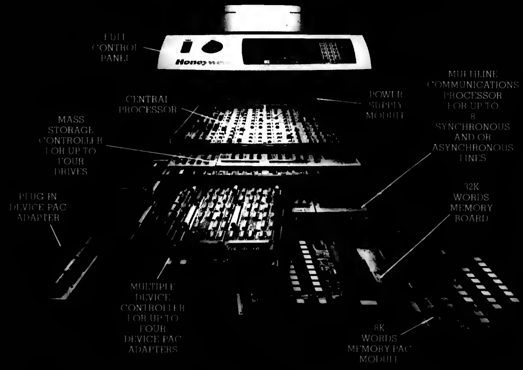
Now you can do things like data entry, transaction processing, communications with a host processor, and data base management—all in a distributed systems environment.

Now you can mix and match these capabilities in any combination you need. And you can expand your Level 6 system as the need arises.

This flexibility comes from having software as modular as the hardware.

And you get the security of having it all from a single mainframe manufacturer with worldwide support facilities.

Modular Hardware.

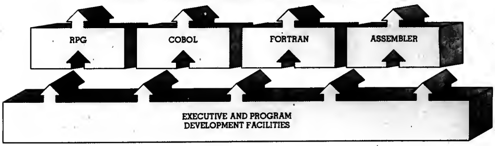

FULL CONTROL PANEL
Honeywell
CENTRAL PROCESSOR
POWER SUPPLY MODULE
MASS STORAGE CONTROLLER FOR UP TO FOUR DRIVES
MULTILINE COMMUNICATIONS PROCESSOR FOR UP TO 8 SYNCHRONOUS AND OR ASYNCHRONOUS LINES
PLUG IN DEVICE PAC ADAPTER
32K WORDS MEMORY BOARD
MULTIPLE DEVICE CONTROLLER FOR UP TO FOUR DEVICE PAC ADAPTERS
8K WORDS MEMORY PAC MODULE

[illegible]

[illegible]

[illegible]

Modular Software.



To complement our modular hardware, Level 6 includes a wide array of modular software.

The GCOS 6 multi-functional software comes in compatible modules that support functional applications such as forms data entry and remote batch with local processing. Plus time-shared program development, terminal concentration, transaction processing, data base management, and file transmission modules that allow connection to Honeywell and other host processors, all in a real-time, distributed systems environment.

And GCOS 6 lets you process different functions and applications at the same time. For example, you can run your own applications, utilize Level 6 functionality like transaction processing, and communicate simultaneously with a host processor on a single Level 6 system.

GCOS 6 modularity lets you design aggressively. With full compatibility of applications interfaces, file systems, and language processors (including RPG, COBOL '74, Fortran '77, and an assembler), you have new freedom to tailor your system to your unique applications.

Whatever your needs, Level 6 lets
you mix and match modules, both hardware
and software, to provide the processing power you need,
when and where you need it.

And Level 6 is backed by Honeywell's
worldwide support facilities. Systems analysts, instructors,
and a field maintenance force of over 3500
in the United States alone.

Modular hardware. Modular software. Worldwide support.
Honeywell has your requirements covered.

Honeywell Information Systems
200 Smith Street (MS 487), Waltham, MA 02154

C

Please send me more information on Level 6

☐ I'm an OEM ☐ Put me on your mailing list
☐ I'm an end user ☐ I've read enough, let's talk

Name

Title

Company

Address

City State Zip

Computerworld

Honeywell

Honeywell Information Systems 200 Smith Street (MS 487) Waltham Massachusetts 02154

System Adds Control to Cataloging Operation

CHURUBUSCO, Ind. — A small business system at a unique division of a Fortune 500 company here is helping the division gain control over its dedicated application.

The company, Dana Corp., is a $1.5 billion firm based in Toledo, Ohio. Its automotive marketing division, based here, is heavily involved in the replacement parts business and the cataloging application that inevitably goes with that business.

In the mid-1950s, the firm decided the catalog task had outgrown conventional methods, according to Frank Sedlacek, manager of cataloging systems.

Catalog methods have to be timely, accurate and all-inclusive, he said, noting catalogs are drawn from voluminous numerical and constantly changing data.

Sedlacek considered a computer ideally suited for catalog preparation based upon his experience with automation in typesetting applications.

With persistence, he was able to secure time on Dana's central mainframe. Until recently, he continued to use the help of the company's mainframe on a time-sharing batch process basis.

As his cataloging tasks continued to grow, time on the mainframe became harder to get for tasks like his, and batch processing became less acceptable to him. His parts cataloging requirements soon outgrew their welcome on the mainframe.

Each year's new car models add to the volume of parts information that must be managed and presented. "The parts business increases at a fast rate ... newer models are introduced faster than older models are retired," he noted.

Dana, he said, must completely revise and publish 12 master catalogs every two years and supply supplemental catalogs during the interim period.

Quick Growth

The next step for Dana was a switch to a Linolex Systems Co., Inc. small business system that was adequate for its needs at the time. When more power was needed, the firm looked at systems from IBM and Microdata Corp.; it chose a Microdata because "you couldn't beat the price." That was three years ago.

Systems Management, Inc., a Microdata dealer, recommended a system that consists of a CPU with 20M bytes of disk storage, a 9-track 800 bit/in. magnetic tape drive, two CRT terminals and a 96 char./sec printer. The printer provides both upper and lower case characters.

Two drives, four terminals and 16K of memory have since been added to the system.

Important Benefits

The system was installed in the Automotive Division's Toledo facility in November 1975. When the division was moved to Churubusco, the system went right along "without a slip," according to Sedlacek.

With its Reality system, Sedlacek said, the division was able to produce its "Victor" catalog without overtime for the first time. Victor is a Dana brand name, and Sedlacek noted that publication of the previous Victor catalog had cost 1,150 man-hours of overtime, or $15,000 in out-of-pocket expenses.

Furthermore, Sedlacek added, the catalog was published with a completely new format. He believed that making this format change without the system's help would have cost approximately $3,200 for keypunching and $2,100 for purchased time. The system saved $20,300 on this publication alone, he estimated.

Savings were also achieved with the system's elimination of the input and proofreading time previously required.

"The system paid for itself within a year," Sedlacek noted.

Sedlacek found he could produce a price list in five working days and "get it out about 10 days earlier." This, he said, allowed the firm to advance the effective data by two weeks.

The system also enabled the division to streamline its manufacturing process. Duplicate parts were identified and have since been eliminated along with the cost of duplicate listing, pricing and warehousing. "This updating has become a continuous cost-saving process," Sedlacek said.

The firm is able to link publications, sales, source and engineering records into one integrated file.

HP System 45 Gains Plot Link

PALO ALTO, Calif. — An interface card that reportedly adds the capability of controlling incremental drum and flatbed plotters to the HP 9800 System 45 desktop system has been announced by Hewlett-Packard Co.

The HP 98040A plotter interface can be used with incremental drum and flatbed plotters that require user-coded data inputs. It enables the System 45 owner to use computer read-only memory (ROM) commands to control plotting functions, including axes, lettering, scaling and plotting of different types of lines, HP said.

Pen selection can also be controlled through the ROM for some plotters with multiple pen capabilities.

The HP 98040A plotter interface costs $600 from HP at 1507 Page Mill Road, Palo Alto, Calif. 94304.

Keep in mind, your prime prospects will be at Computer Expo '78... so will your competition.

COMPUTER EXPO '78

Control Data
Datapro
Printronix
Codex
Lear Siegler
E M & M
The Morley Company
Vanier Graphics
Total Typography
Wang Labs
Computer Devices
Ann Arbor Terminals
Datapro Research
Inforex
Perkin-Elmer
Telcon Industries
Versatec
Computer Performance
Advanced Systems
Delta Data Systems
Informer
Computer Decisions
Intosystems
T-Bar
Corporate Systems
Dynatech
Midwest Marketing
Logabax
AAA Chicago Computer
Intelligent Systems
IBM
General Computer
Atlantic Research
Telefile Computer Products
General Electric
Qume
Moore Business Forms
DataMedia
Texas Instruments
Computerworld
NCI
Deltek
Kodak
BASF
Western Union
Anderson Jacobson
Computer Input Services
Peradyne
ComData
Genesis One
Data Processing Sciences
Applied Computer Systems
Agile
Woodford Systems
American Used Computer
Business Forms Service
Computer Roomers
Customer Priorities
Computer Software Solutions
Systems Marketing
Itel Corporation
Peripheral Products
Applied Digital Data
Epic Data
Sykes Datatronics
Cummins Allison
American Microprocessor
International Data Corp
Programs, Inc.
Beehive International
Intertec Data Systems
Software AG
Creative Engineering
Graphic Controls
Mini-Computer Systems
Tandem Computer
PCC/Pertec
Computrend
Extel
Mentel
Sycor
Digitronics
TRAC Associates
Computer Services
Datamart
Courier Terminals
S B C
Shasta
Mostek
DIVA
Sperry Univac
Terminal Rentals
Applied Data Communications
Data Forms Company
Imperial Technology
Mathematica
Rienda Electronics
Computer Corp of America
AT&T
Cullinane
Hewlett Packard
Pansophic Systems
General DataComm Industries
Continental Peripherals
Computer Associates
Qantel
Diablo Systems
Marketechs
Racal-Milgo
Data Systems Specialists
Kay Tronic
Administrative Management
Small Systems World
American Terminal Leasing
Journal Systems Management
Optical Business Machines
Datamation
Communication News
McCormack & Dodge
Data Rentals

42,178 buyers attended the 1977 Computer Caravan 9-city tour... that's an increase of 32%

Computer Expo '78 is part of a nationwide Conference and Exposition program, which each year serves the computer community by bringing nine regional Computer Expos to the most important business areas in the U.S.

If you're marketing computer products or services, then you'll want to be in one or more of the regional Computer Expos beginning in March. How else can you meet well over 50,000 computer buyers across the country in just nine short weeks?

For complete information on how the 1978 Computer Expo can work for you, use the coupon below or call Kim Wichert, toll free 800-225-4242. In Massachusetts, (617) 964-4550 (collect).

I'm interested in the following Expos:

To: KIM WICHERT, President
THE CONFERENCE COMPANY
60 Austin Street
Newton, MA 02160

☐ Southern California Computer Expo	Anaheim/LA	March 21-23
☐ Northwest Computer Expo	San Francisco	March 28-30
☐ Southwestern Computer Expo	Houston	April 11-13
☐ Southeastern Computer Expo	Atlanta	April 18-20
☐ Gateway Computer Expo	St. Louis	April 25-27
☐ Midwestern Computer Expo	Chicago	May 2-4
☐ Mid-Atlantic Computer Expo	New York	May 9-11
☐ Great Lakes Computer Expo	Detroit	May 23-25
☐ New England Computer Expo	Boston	May 30-June 1

☐ **We're interested in exhibiting.**
- ☐ Have Sales Representative call me
- ☐ Send Reservation Agreement
- ☐ Send Copy of 1977 Attendee Analysis

☐ **I like to attend, please send more info.**

Name ______________________ Title ____________
Company ______________________________
Address ______________________________
City ______________ State ____________ Zip ______
Phone: (_____) ______________________

limited offer while supply lasts!

LS120 DECwriter III

$2650.00

While supply lasts, we'll ship you a brand new LS120, wide carriage, 1200 baud impact terminal at this special low price. Call us today and we'll give you a Serial Number. You can talk to us about a trade-in or discuss CDT's other fine quality terminals offered at similar low prices. But you must send cash with order to qualify for this special low price!

IMMEDIATE DELIVERY FROM STOCK

Call toll free
800-227-1500

CDT

Consolidated Data Terminals, P.O. Box 2261, Oakland, CA 94621 (415) 638-1222
and P.O. Box 91137, Los Angeles, CA 90045 (213) 670-0400

THERE'S A LITTLE BIT
OF THE WIZARD
IN EVERY
SOUTHERN SYSTEMS
PRINTER.

And that's why more and more mini-computer users — and DECsystem-10 users, too — are putting Southern Systems printers to work for them. They know a little bit of the Wizard goes a long way . . . in trouble-free printer performance, in cost-saving (up to 50%), in efficiency of future system expansions.

The Wizard? He's actually just a symbol (but don't tell him that!) of Southern Systems expertise . . . in the precise configuration of printers . . . in the design and manufacture of new interfaces and controllers (like our S-10 for DECsystem-10) . . . in the delivery of printer systems for about half of what you'd pay elsewhere.

Southern Systems printers. For your DEC, Data General, Interdata or others. At speeds from 300 lpm up to 1500 lpm. SSI typically ships within 30 days and offers complete installation and nationwide service.

No wonder our customers keep coming back to us for a little bit more of the Wizard. You will, too.

For more information, call or write to

SSi
SOUTHERN
SYSTEMS, INC.
Intracoastal Building
3000 Northeast 30th Place
Fort Lauderdale, Florida 33306
(305) 561-5226

Tape System Eases Transfer Between Syfa, IBM 360/370

IRVINE, Calif. — A high-speed magnetic tape system that reportedly functions as a supplementary data transfer link between Computer Automation, Inc.'s (CA) Syfa system and IBM 360/370 mainframes is available from CA.

Comprised of all drive and controller hardware, an operator's panel and utility software, the magnetic tape system is available in either an 800 bit/in. version (MAG-800) or as a switch-selectable 800 and 1,600 bit/in. version (MAG-1600).

Both were designed to function as adjuncts to the on-line hardware supplied with each Syfa system, giving users the capability of transferring magnetic tape data to and from mainframe systems.

Both the MAG-800 and the MAG-1600 operate at 25-in./sec and use industry-standard 10-1/2-in. reels. Recording is carried out using NRZ format, allowing the system to interface directly with existing IBM-formatted tapes with no need for reprogramming, the company claimed.

The utilities provided with the MAG-800 and the MAG-1600 include DSKTAP and TAPDSK. The DSKTAP utility takes Syfa text files and writes it to magnetic tape in OS-standard unlabled, fixed-block and fixed record forms, according to a spokesman.

TAPDSK reads magnetic tapes formatted for use on IBM equipment and converts the data to a Syfa text file; both programs may be run in the stand-alone or concurrent mode, he noted.

The MAG-800 costs $8,275; the MAG-1600 is priced at $15,000. CA is at 18651 Von Karman, Irvine, Calif. 92713.

Vendors Say They're Acting To Improve Documentation

(Continued from Page 49)

spokesman for Basic/Four Corp. noted.

Producing better documentation has also been made a priority at Data General Corp., a spokesman for that firm said. "In the past, documentation tended to be reference manuals rather than tutorials," he recalled, but with new types of users using the systems, the manuals are being reworked.

"If the documentation doesn't describe how to use it, you've got a problem," he pointed out.

Search for Strategy

A user should check to see if his vendor has a documentation strategy, a spokesman for the Hewlett-Packard Co. said. Vendors should treat documentation as they do other products and put it through the same type of testing. At HP, the documentation is evaluated at the test site along with the hardware and software.

Admitting that about 80% of all user problems are related to inaccurate documentation or inadequate training, the spokesman said HP has made improvement of both areas a goal. "We heavily use our users group for feedback on the documentation," he added.

At Datapoint Corp., two levels of documentation are available to the users of that maker's equipment. The first is a user's manual, which is written by the person who wrote the software program being described and is definitely "not the sort of thing you'd give a noncomputer type," according to a spokesman there.

The second level of documentation is written by Datapoint's marketing communications department. These manuals, written in simpler langauge, are critiqued by the support group, testing group and product marketing department before they are released to make sure "the user's guide and the programs agree."

Developing good documentation is a recognized problem at Datapoint, but the recently initiated check-and-balance system that requires cross-checking of the documentation should help, the spokesman said.

Recognizing that most mini companies were founded by engineering types, not user-oriented types, a spokesman for Tandem Computers, Inc. said "we spend a lot of effort to get good documentation. We can make a change in a manual and have printed copies in the mail within a week."

"Most of our documentation is on an engineering level because we are OEM," a spokesman for the Naked Mini Division of Computer Automation, Inc. stated. Because of that division's OEM status, the company feels no need to revise its methods of producing documentation.

Metal Firm Gets First IBM 34

(Continued from Page 49)

one that is already running on the 34, is Union Brass' complicated incentive payroll system. Each week, 100 of the company's 175 employees produce 1,600 labor tickets based on patterns and job numbers.

On the 3/10, the data from the tickets was entered on punched cards. It took two days before an incentive worker knew his productivity.

Using the 34, that time will be cut in half, Poston believes. Data will be entered through a data collection station.

Conversion from the 3/10 to the 34 took several steps, according to Earl Feign, DP manager for the firm. Since the 3/10 was a card-oriented system, the company had to obtain a disk for that system and put all programs on disk.

The disk was then taken to an IBM 3/15 at an IBM office and converted from disk to diskette. That diskette was dumped into the 34 and all changes and recompiling necessary took place.

The System/34 installed at Union Brass has 48K bytes of main memory and 27.1M bytes of disk storage.

DIGITAL ANNOUNCES THE Great 8 Sale.

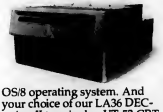
Because you've made the PDP-8 the biggest success in the minicomputer world, we'd like to say thanks. So we're having the Great 8 sale of 1978. Your chance to pick up great buys on the small computer of the year.

Save 20% on our new packaged systems.

DESIGNATION	MEMORY	OLD PRICE	NEW PRICE	SAVE
8A/T3	16K Core	$24,629	$19,000	22%
8A/T5	32K Core	27,829	22,000	20%
8A/T7	64K MOS	31,479	24,500	22%

The computer that's always been right on the money now costs less than ever. 20-22% less, depending on the system.

And all these systems include our DKC8-AA option board with real time clock, console control, 12-bit parallel I/O interface and asynchronous serial line unit. In addition, you get 1.6M word removable disk cartridge drive. A 3.2M non-removable disk drive. Short cabinet and cables. RTS/8 real time operating system and OS/8 operating system. And your choice of our LA36 DECwriter II terminal or VT-52 CRT.



Save 8-17% on disk drives.

You can buy our RKO5J 1.6M word removable disk and save 8%. Or our RKO5F 3.2M word non-removable disk and save 17%. Or add both, and save both ways at once.

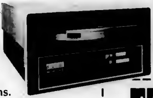
Save 13-31% on terminals.

The LA36 DECwriter II is the most popular keyboard printer for the PDP-8. And now, it costs 14% less. What's more, it's available in two versions. One with a 15' 20mA cable. The other with a 9' EIA cable.

You can also pick up video terminals at prices that are hard to put down. Save 13% on a single VT52 CRT and keyboard. Or buy four and save 31%.

Save 30-40% on add-ons.

We've marked down the price of the following add-ons until June 30, 1978. So if you act now, you can save hundreds of dollars on selected options.



Save 40% on our fast FORTRAN accelerator for the PDP-8/A. The FPP8-A accelerator includes floating point hardware, OS-8 and FORTRAN IV. It lets the data manipulation portion of your FORTRAN IV programs run up to twenty times faster by implementing floating point arithmetic in hardware instead of software. So you get more speed for less money.

Save 43% on our FORTRAN IV accelerator for the PDP-8/E, 8/F or 8/M. This unit is functionally the same as the one for our 8/A, except it fits into our Hex-size expander box.

Save 33% on our DP8-EA synchronous modem interface. The DP8-EA is supported by DECnet™/8 software and lets you communicate over phone lines by providing the link between your modem and any model PDP-8 with OMNIBUS.™

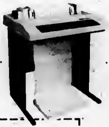
Save 33% on our KG8-EA redundancy check option. The KG8-EA is designed to improve throughput dramatically by performing redundancy checking in hardware.

Save 34% on our MM8-EJ 8K core memory. Now you can add more memory to your PDP-8/E, 8/F or 8/M for less than ever before.

60-day delivery on everything.

Our 1977 expansion program means fast deliveries in 1978. In fact, it means 60-day delivery on just about everything. (PDP-8 packaged systems with more than 32K of memory may take a little longer.)

So act now. And save now. Call your nearest Digital sales office. Or fill out the coupon and send it to PDP-8 Marketing Communications, Digital Equipment Corporation, 129 Parker Street, PK3-1/M34, Maynard, Massachusetts 01754. European headquarters: 12, av. des Morgines, 1213 Petit-Lancy/Geneva. In Canada: Digital Equipment of Canada, Ltd.



digital

PDP-8 Marketing Communications,
Digital Equipment Corporation,
129 Parker Street, PK3-1/M34,
Maynard, Massachusetts 01754.

☐ Please send me more information. ☐ Have a salesman call.

☐ I am currently a PDP-8 User. Model (such as 8A, 8E) ______

Name ______ Title ______

Company ______

Address ______

City ______ State ______ Zip ______

Phone ______ OEM ______ End-User ______

Application ______

CW1168

NOVA & ECLIPSE MAINTENANCE

(Who Needs Those Hardware Headaches?)

CSSC has now expanded its maintenance service to include nationwide depot service at fixed rates for all Data General NOVA and ECLIPSE lines. Turn around is normally within 72 hours with service being performed by qualified field engineers. Plug in compatibles also serviced. Still available is our on-call and per-call field service at rates much less than the competition.

NEED FAST TURNAROUND? CALL OR WRITE:

COMPUTER SYSTEMS SUPPORT CORPORATION
9112 Gaither Road
Gaithersburg, Maryland 20760

DEPOT SERVICE
(301) 948-6550

FIELD SERVICE
(301) 424-7870

HP 3000-II Model 6 Minis Get More I/O, Memory Price Cuts

CUPERTINO, Calif. — Several field- and factory-installed memory expansion options, an I/O expansion option and two memory price reductions for the HP 3000 Series II Model 6 minicomputer were recently announced by Hewlett-Packard Co.

The firm reduced the price of its 64K-byte boards by about 20%. As system options, they now cost $3,700, down from $4,700. Field add-on boards now cost $4,000, a spokesman said.

The cost reductions are said to allow users of HP's 3000 Model 6 to increase their capabilities without having to upgrade to the full larger Model 8 system.

The maximum main memory available on a Model 6 has been doubled from 256K bytes to 512K bytes. Users in the field can purchase a memory expansion kit, priced at $10,000, that allows the expansion to take place. The kit includes a memory power supply, controller, error-correction controller, 64K-byte array board and connecting hardware.

With another field kit, users of the Model 6 with expanded memory can add 13 additional I/O ports so it can handle larger networking operations. This kit costs $15,000, HP said.

The company is located at 1501 Page Mill Road, Palo Alto, Calif. 94304.

Cobol Aided On Series/1

ARLINGTON, Va. — Advanced Software Products, Inc. will have a microprogrammable attachment card for the IBM Series/1 minicomputer that will act as a hardware assist for Series/1 Cobol programs. The card will reportedly be available in the fourth quarter.

The unit, consisting of an industry-standard microprocessor and loadable control storage, is said to be transparent to the Cobol user. "It is expected that Cobol programs using the attachment will execute faster than the equivalent Series/1 Assembler language programs," the company claimed.

Each unit will be packaged onto a single card to plug into a Series/1 backplane as an I/O attachment. Multiple units can be placed into a Series/1 system, the company added.

Although the company said the price for the unit has not been firmly established, it will be approximately $2,000, the company said. Advanced Software Products can be reached at P.O. Box 992, Arlington, Va. 22216,

Diskette File Holds 20 Units

COMMACK, N.Y. — A binder-style portable diskette filing system capable of holding up to 20 diskettes was announced by the Data Products Division of Robins Industries Corp.

The Model 78050 diskette file features a floating axle designed to eliminate stress in handling and is equipped with a snap-lock vinyl cover to keep the diskettes in place until the binder is opened.

Purchase price is $42 per unit from Robins Industries Corp., 75 Austin Blvd., Commack, N.Y. 11725.

At only $1088, you can't offer your customers a better buy.

Our quantity-50 OEM price for the *Silent 700** Model 743 KSR Terminal is now just $1088†. In larger quantities, the price goes below $1000.

And it keeps on costing less because the real payoff is in the cost of ownership. In the long run, it costs less than any other printer terminal with comparable performance.

The reason is easy. Superior design. The 743 KSR is built around a TI microprocessor. So, there are fewer components and circuit boards than in other printer terminals. That means less maintenance and more uptime performance. Plus standard EIA and current loop interfaces in a lighter, desktop package.

The 743 features the speed, reliability and quietness that made the *Silent 700* terminal family so popular. Incoming data is buffered, so you get true 30 characters-per-second throughput.

TI's Model 743 KSR

Disturbing noises associated with impact printers are eliminated with the 743's non-impact electronic printing.

Use it as a console I/O for software development. Keyboard terminal for inquiry/response. Data entry. Interactive remote computing. Or as a message terminal network. And it's now available with APL.

The 743 is backed by TI's worldwide maintenance and support services.

Find out more about TI's 743 KSR printer terminal. Fill out and mail the coupon today. Or call your nearest TI sales office, or Terminal Marketing, (713) 491-5115, extension 2126.

TEXAS INSTRUMENTS
INCORPORATED

Yes! I am interested in the 743 KSR Printer Terminal.
☐ Please have your representative call me.
☐ Please send me more information.

SILENT 700
electronic data terminals

Name ____
Title ____
Company ____
Phone ____
Address ____
City ____ State ____ Zip ____
Mail to: Texas Instruments Incorporated, P.O. Box 1444, M/S 784,
Houston, Texas 77001

2-1-CW

*Trademark of Texas Instruments

Copyright© 1977, Texas Instruments Incorporated
†U.S. Domestic Price

TEXAS INSTRUMENTS.

Avoids Unnecessary Details

Book for Learners Starts From Scratch

By Tim Scannell
CW Staff

BERKELEY, Calif. — "The first dishonest auto mechanic probably swindled his first customer a few months after the first automobile was sold; and the first dishonest programmer probably used a computer for criminal purposes soon after computer programs started to be written." Thus begins a book on microcomputers that attempts to pique the interest of readers "who know nothing about computers."

An Introduction to Microcomputers — Volume O — A Beginner's Book, by Adam Osborne and Associates, Inc., was written for two audiences: "for those of you have a real interest in learning how to use computers and for everyone else who must live with computers, like it or not, and had therefore better know a little about them," according to the book's introduction.

Chapter One introduces the reader to the various types of equipment involved in a microcomputer system and examines what each system part does. The functions of the CRT, keyboard, interface, printer and, of course, microprocessing unit are discussed along with the specific terminology involved.

"One of the problems associated with microcomputers and microcomputer systems is terminology and language," the book explains. "While a lot of terminology is pure jargon for its own sake, some terminology is necessary," it adds.

The book concentrates on presenting the reader with a basic understanding of the equipment incorporated into a microprocessing system rather than the technical specifications behind that equipment's operation.

On the topic of floppy disk units, the book says "... until you become a real microcomputer expert, you need not concern yourself with exactly how information is stored on a floppy disk ... just as music lovers never concern themselves with how music is recorded on tape, cassettes or records."

Through the creation of Joe Bitburger, an "intrepid" computer hobbyist who is suddenly "seized by a fit of irrationality, during which he buys a microcomputer at his local computer store," the book highlights the variety of micro applications.

The text follows Joe as he "... proudly takes his microcomputer home ... gets his microcomputer to work ... writes his program ... debugs his program ... and triumphantly sits in front of his microcomputer — watching a light chase around and around the display." In the process of telling this story, the book introduces the reader to teletypewriters, memory chips, bootstrap loaders, read-only memory (ROM), printers and paper-tape readers.

In a chapter covering applications, the authors illustrate the concept of physical and logical units by dramatizing one area of Joe's life. "Joe Bitburger requires a 'wake up' logical unit in the morning or he will not get out of bed in time, so an 'alarm clock' physical unit implements the 'wake up' logical unit."

The book explains that a "physical record or file is the form in which information is actually stored by a bulk storage device, whereas a logical unit or record is the way in which you as a microcomputer user visualize and use the stored information."

"You cannot always differentiate between a necessity and an option ...," according to a section on microcomputer system component options. It proceeds to describe various CRT options such as a cursor, "a small spot or square of light sitting where the next character will be displayed;" scrolling, or "the ability to look at lines that are longer than the screen is wide ... or having more lines than the screen will display"; and the graphic display, which "allows you to display pictures as well as characters."

The discussion of keyboard options includes a description of rollover, buffer and debouncing electronics.

Options Evaluated

The book frequently compares and evaluates options and their functions. In discussing mechanical and electrical switches, it states that electrical switches, "... if not designed well, will give you nothing but trouble. Just a small amount of corrosion on the metal surfaces is sufficient to render the switch ineffective."

Some options, the book continues, are added as a psychological crutch for the user. "The commonest option is to have an audible or tactile 'click' accompany a key being depressed. The microcomputer does not need a 'click,' [but] the human operator does; it is there simply to reassure an operator that the key has indeed been depressed ... Touch

(Continued on Page 61)

Micro Bytes

Lead Straightener Adjusts to Width

DANBURY, Conn.— A manual integrated circuit (IC) lead straightener that accommodates widths of .3-, .4-, .5- and .6 in. has been announced by Micro Electronic Systems, Inc.

The Fix-A-Dip, which fits two- to 40-pin dual in-line packages (DIP), can be factory adjusted to the width primarily required by the user, the vendor said.

The unit is basically a dual set of specially cut racks that are spring-loaded in the open position.

The Fix-A-Dip sells for $199.50 from Micro Electronics Systems, 8 Kevin Drive, Danbury, Conn. 06810.

PCS Adds Plug-In Micro

SALINE, Mich. — Process Computer Systems, Inc. (PCS) has added a model to its Superpac 180 plug-in line of microcomputers — the Superpac 8, featuring an 8-slot chassis and 300-watt switching power supply.

Superpac 8 triples the expansion capabilities of the Superpac 4, the firm said, providing a wider range of I/O capability.

PCS offers three CPU models, incorporating 8080 and Z-80 microprocessors. Real-time operating systems and a Fortran compiler are also available, PCS added.

Complete with CRT, keyboard, power supply and power cord, Superpacs are available in quantity at $995 per unit from Process Computer Systems, Inc., Saline, Mich.

Correction

One- through four-year lease rates on the Texas Instruments, Inc. Model 810 microprocessor controlled printer [CW, Nov. 7] were reduced $15/mo.

PCM-12 Gets Interface Modules

SAN RAMON, Calif. — Pacific Cyber/Metrix, Inc. has added a reader/punch interface and a magnetic tape interface to its line of supports for that firm's PCM-12 microcomputer system.

The 12070 reader/punch module interfaces the Addmaster 601 paper-tape reader and the Epson 6110 paper-tape punch to the PCM-12, a spokesman said.

PDP-8 Compatible

The interface is compatible with Digital Equipment Corp. PDP-8 software and uses that company's device codes, 01 and 02, to operate the reader at rates up to 150 char./sec and the punch at 50 char./sec, he stated.

The 12080 mag-tape interface allows an audio cassette recorder to be substituted for the paper-tape reader and punch, the firm said. Features of the unit include a byte-standard, self-clocking circuitry that reportedly allows operation at a faster rate than that of the reader/punch on a teletypewriter terminal.

Price of the 12070 is $97 in kit form and $167 assembled. The 12080 costs $117 as a kit and $187 assembled from the firm at 3120 Crow Canyon Road, San Ramon, Calif. 94583.

Prom/RAM Board Occupies Two Independent 8K Blocks

WESTLAKE VILLAGE, Calif. — A programmable read-only memory (Prom)/random-access memory (RAM) board that can conform to system configurations with a minimum of address jumpers was unveiled by Vector Graphics, Inc.

The board occupies two independently addressable 8K blocks and has a 1K on-board RAM and capacity for up to 12K 2708-type erasable Proms, a spokesman noted. Video boards or disk operating systems can be fitted in the 3K of unused space and a 24-command Prom monitor is available to interface with most I/O boards, the firm said.

The board is priced at $135 in kit form and $175 assembled from the firm at 790 Hampshire Road, Westlake Village, Calif. 91361.

Tapes, Text Teach Basic

WILLIAMSVILLE, N.Y. — *Programming in Basic,* a program series of four cassette tapes coordinated with four printed texts, is available from the Williamsville Publishing Co.

The tape and text course is constructed for the microcomputer hobbyist and assumes that the individual has no previous programming experience. The learner is afforded the opportunity to hear on tape what he is seeing in the text at the same time, the company said.

The course is authored by William R. Parks, an assistant professor of computer science at Walters State Community College.

The program is priced at $19.95 and can be obtained from the Williamsville Publishing Co. Inc., Box 237, Williamsville, N.Y. 14221.

ECHO — Refers to a portion of the transmitted signal that has been reflected or otherwise returned with sufficient magnitude and delay to be received as interference.

EDITOR, MICROCOMPUTER — Editors permit designers to prepare the original Assembly language programs and to change or correct them with simple commands. They can add documentation and store, combine and retrieve programs. They also can readily output programs onto paper tape as well as printers.

EIA INTERFACE — Refers to a set of signal characteristics (time duration, voltage and current). For connection of terminals to modem units and specific physical coupler dimensions specified by the Electronic Industries Association.

EMULATION — A procedure designed to imitate one system with another such that the imitating system accepts the same data, executes the same programs and achieves the same results as the imitated system.

ENABLED — 1. Refers to a state of the central processing unit that allows the occurrence of certain types of interruptions. Synonymous with interruptable. 2. In communications, pertains to the state in which a transmission control unit can accept incoming calls on a line.

END-OF-DATA MARKER — Refers to a character or code that designates that the end of all data held on a specific storage unit has been reached. Not to be confused with end-of-file marker.

END-OF-FILE (EOF) — Refers to the termination or point of completion of a quantity of data. End-of-file marks are used to indicate this point.

END OF MESSAGE (EOM) — Refers to a specific character or sequence of characers which indicates the termination of a message or record.

END-OF-RUN ROUTINE — A specific routine provided by the programmer to deal with various housekeeping operations before a run is ended, i.e., rewinding tapes, printing control totals, etc.

END-OF-TAPE ROUTINE — A specific program either provided by a housekeeping package or written by the user that supplies the special processing required when the last record on a reel of magnetic tape has been reached.

END-OF-TRANSMISSION (EOT) — Refers to a unique character or group of characters used to denote the end of a data transmission to or from a remote terminal.

ESC, ESCAPE CHARACTER — 1. A control character to signal a change in the meaning of one or more of the characters that follow it. 2. A data communications term representing the use of a control character which, when combined with one or more succeeding characters, forms an escape sequence and the development of additional data communications control operations.

LEARNER'S LESSON

From Microcomputer Dictionary & Guide by C J Sippl and D A Kidd Used with permission of Matrix Publishers, Inc
207 Kenyon Road, Champaign, Ill 61820

COMPUTERWORLD

MICROCOMPUTING CLASSIFIED EXCHANGE

Where to find bargains,
buyers, programs,
peripherals or personals.

MICRODATA REALITY CORE memory. Manufactured and serviced by Microdata. Jack Herdmen (201) 751-3000.

FOR SALE: IBM 5100 COMPUTER 64K, APL, 5103 Printer, Disk, Serial I/O, Software for multiple interfaces, academic and business applications, tapes. Please call Andrew Stedry (313) 851-8282.

Microsoft ("Altair") BASIC for 8080/6502 and FORTRANIV for 8080/Z80 now available to OEMs, end users. 8080/Z80 BASIC has random, sequential files; double precision: IF ... THEN ... ELSE and more. FORTRAN produces optimized relocatable code, meets ANS166 except complex. CP/M and ISIS-II BASIC or FORTRAN, off the shelf or custom versions. Microsoft, 300 San Mateo NE, Suite 819, Albuquerque, NM 87108 (505) 262-1486.

HOW TO ADVERTISE: This special classified section in solid (non-display) format is designed for people who are working with or interested in microcomputing. Through it, you can buy, sell or swap equipment, software or services; contact people with similar interests; start clubs; disseminate information; look for game partners; or send messages to other individuals. As the number of ads increases, this section becomes more useful; so we've tried to make ad placement as simple and inexpensive as possible. Details are as follows:

ORDERING: The attached form will serve as the simplest way, we feel, to place your ads in Microcomputing Exchange. Please do not use it for other classified sections of Computerworld. They are display format and have different procedures and rates. Publisher reserves the right to refuse ads for this section, to limit the size of ads placed, and to limit the number of ads placed by any one person or company.

PAYMENT: Must accompany your order. No exceptions. Your check will be accepted.

COPY AND CLOSING: Deadline for copy to be in our hands is Friday, ten days preceding Monday issue. All copy must be submitted in writing (no copy taken over the phone), clearly typed or printed. We cannot be responsible for errors in printing made from illegible copy.

RATES: 80¢ per word. All words set in same size and typeface; up to first five words may be boldface. In making word counts, include name and address. Name of city (New York) or state (New Jersey) counts as two words. Zip code or phone number (including area code) counts as one word. Symbols such as RAM, CRT, etc. count as one word. Hyphenated words count as two words. No commissions paid to agencies.

BOX NUMBERS: Available at $5.00 per insertion. Send replies to box numbers to: Box (XXXX), Microcomputing Exchange, Computerworld, 797 Washington Street, Newton, Mass. 02160.

ORDER FORM: To: Microcomputing Exchange, Computerworld,
797 Washington Street, Newton, MA 02160.
I have read the rules, and would like to place my ad as follows:
Date of first appearance (or "next available issue"): ____________
Number of weeks ad is to run: ________ Box number desired (add $5.00): ____
COPY: (Attach copy on typed or printed page.)
Total words at 80¢ each equals: ________ Plus Box Charge (if any): ______
Equals total cost per insertion: ________
Times total number of insertions: ________ Equals total enclosed: ________
Name ______________________________
Signature ______________________________
Address ______________________________
City ____________________ State ______ Zip ______
Phone where you can be reached during day (____) ______________

Unit Gives Micros Remote Control

NEW YORK — A microcomputer can reportedly operate and monitor remotely located lights, motors, solenoids and other 110V devices with a system introduced by Mountain Hardware, Inc.

The Introl remote control system, which consists of a controller and a remote unit, installs a microcomputer via an S-100 bus microcomputer and transmits and receives signals through a 110 Vac line. Digital signals generated by the controller board contain an address that selects the proper remote device and a command to turn that device on or off, a spokesman said.

An interface adapter impresses this digital signal on top of the 110 Vac waveform and isolates the computer from the line voltage, he added.

The board can control or sense up to 64 remote locations, and programs are written in Basic. The S-100 controller board and the AC Remote, sold separately, are supplied with full documentation and software subroutines.

The Introl Controller is priced at $149 in kit form and $189 assembled and the AC Remote costs $99 for the kit and $149 assembled from Mountain Hardware, Inc., Box 1133, Ben Lomond, Calif. 95005.

LSI-11 Gains Interface

ORANGE, Calif. — MDB Systems has begun marketing an incremental plotter interface for the DEC LSI-II microprocessor called the MLSI-XYV-11, which provides a parallel interface to Houston Instruments Corp., California Computer Products, Inc. or equivalent XY plotters from the LSI-11 bus.

The interface board includes a data register, control register and a status register. The data register contains instructions for right, left or middle pen down; raise all pens; step pen carrier left or right; and step drum forward or back.

Stepping speed is controlled by adjustment of a potentiometer at the connector end of the module, and plotter operation up to 100 ft. from LSI-II bus is allowed by jumper selection of +5V or +12V to eight control lines.

The MLSI-XYV-11 plotter interface is priced at $550 per unit. MDB Systems is located at 1995 N. Batavia St., Orange, Calif. 92665.

Printer Based On Selectric

ANAHEIM, Calif. — Micro Computer Devices has introduced the Selecterm, a converted IBM Selectric II typewriter that can be used as a printer when connected to either the serial or parallel port of any microcomputer, a spokesman said.

Logic is contained in an internal programmable read-only memory (Prom) and the unit can produce Ascii and upper/lower case alphanumerics via a typing element, he added.

The Selecterm is a functioning typewriter that has been approved by IBM and its warranty remains active, the firm noted. Price of the printer is $1,650 from the firm at 960 E. Orangethorpe, Building F, Anaheim, Calif. 92801.

Handbook Starts From Scratch

(Continued from Page 59)

switches are not popular at the present time ... The real problem ... is the fact that when you touch one, it makes no audible click and that upsets many long-time keyboard users."

Printer options and bulk storage unit options are featured in the chapter on system components whose theme is "... What you see is not always what you get."

The last half of the book deals with how a microcomputer works. If "... you do not need to know how the microcomputer system works, then the rest of this book will be of little value to you," the chapter begins. "In order to ride a bus you do not have to know how a bus works; you do not even have to know how to drive one," the authors note.

"However, if you want the increased flexibility of a private car, you must learn to drive; you may even learn how your car works in order to fix it yourself," they add.

The pages that follow cover binary arithmetic, octal and hexadecimal numbers, character codes, computer logic and Boolean operations, the CPU, program memory and data memory. Additional topics include buses, registers, logic concepts and memory addressing logic.

The publication is priced at $7.50 from Osborne and Associates, Inc., P.O. Box 2036, Berkeley, Calif. 94702.

Input Digitizer Debuts

FAIRFIELD, Conn.— A data input digitizer designed for the collection of X, Y values and compatible with most microcomputers has been announced by the Summagraphics Corp.

Bit Pad is an input peripheral that permits the entry of positional information via an optical stylus, a spokesman said.

Price for the unit, with deliveries beginning this month, is $555 from the firm at 35 Brentwood Ave., Fairfield, Conn. 06430.

Register now for DataComm 78!

Call 800-225-4242*

Don't miss the one Data Communications Industry Conference and Exposition held in the city where DataComm policy and regulation are established!

Profit from vital information, insight, ideas brought to you by nationally known data communications experts! Be there in person. Don't get DataComm secondhand!

Call 800-225-4242

Take part in panels and sessions that let you ask *your* questions, share experiences, express your needs.

Make DataComm your personal conference, choosing your options each day— ranging from tutorials for the beginner to advanced networking panels for the sophisticated user.

Call 800-225-4242

And register for one, two, or all three action-packed days, including:
19 Vendor/User Rap Sessions • 3 Special Management Sessions • 6 Network Tutorials and Panels • All Day Government Miniconference—and MORE!

FREE! The Exposition at DataComm 78 will feature exhibits from manufacturers all over the country. Discuss your needs and plans with key representatives in a quiet-paced, informative atmosphere.

Call 800-225-4242

REGISTER NOW!
If this is the first news you've learned about DataComm 78, don't miss this chance to attend.

AFFORDABLE:
UNMISSABLE! Just $115 for the whole DataComm Conference, or $50 each for single days.

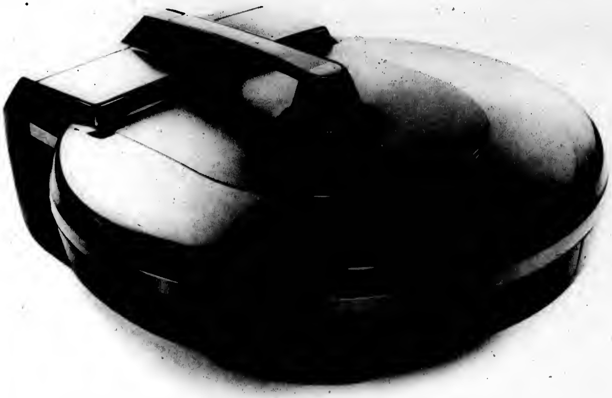
Don't delay! Master Charge, American Express, Visa/Bankamericard accepted. Call our toll-free number now to arrange your attendance at DataComm 78 - the ONE conference you don't want to read about later and be sorry you missed.

DataComm 78
CONFERENCE AND EXPOSITION
February 21-23, Washington, D.C.

*Inside Massachusetts, call collect: (617) 964-4550. Or write DataComm 78 Registration

The Conference Company
60 Austin Street, Newton, MA 02160

Compare...
BASF offers you
a 30% saving,
lifetime guarantee,
free field service,
and immediate delivery.



The first name you think of in computers may not be the best choice in data modules. While still completely compatible with existing 3340 drives, BASF data modules cost far less than the drive manufacturer's modules, are guaranteed for as long as you use them, offer free field service, and are available for immediate delivery nationwide.

Before you write your next order for data modules, find out why BASF has more to offer.

Call our nearest regional office: in Bedford, (617) 271-4007; in Los Angeles, (213) 451-8781; in Chicago, (312) 343-6618; in Clifton, N.J., (201) 546-9111; in Dallas, (214) 233-6607; in Toronto, (416) 675-3611; and in Montreal (514) 341-5411.

BASF The Original.

Computer Tapes Disk Packs Flexydisks Word Processing Supplies

Corporate Documents Indicate

'Defensibility' Behind IBM Unbundling

By Catherine Arnst
CW Staff

NEW YORK — IBM unbundled maintenance costs from the price of its CPUs in part to ensure that its position was "legally defensible," according to corporate documents used by the government in the U.S. vs. IBM antitrust trial.

A document done for Cravath, Swaine and Moore, IBM's outside counsel, stated that a Services Practices Group was established to "resolve a list of purchase policy irritants related to maintenance and make recommendations to put us in a posture that is legally defensible ... recommend changes to lease and purchase maintenance offerings which will make it easy to unbundle later, if necessary, but do not make any changes that would lead to forced unbundling."

Prior to IBM's decision to remove maintenance costs from the price of the system in 1969, it charged all customers a certain price for a system regardless of how many services were used.

One of the problems with this practice was that it was "not enforced uniformly. Forty-eight customers paid 34% of total extra shift revenue. Department of Justice has notified us of complaints on file," the study said.

An attorney with IBM's legal department also noted that IBM's bundled price was unfair to some users, according to documents. "The basic issue is — are we forcing the customer (or the independent maintenance company) to pay for something he does not want. The answer is 'yes we are' ... Therefore, even though our customer is willing to do without [a particular service], he must pay the charge for that service if it is included in the purchase price. Similarly, if an independent maintenance company tries to undercut our price by offering something less, it would be foreclosed from doing so," H. Bartow Farr Jr. wrote.

Emphasis Grew

Greater emphasis was placed on unbundling plans by IBM after the Department of Justice (DOJ) filed its suit against the firm in January 1969. At an IBM Management Review Committee meeting held that month and attended by the top corporate executives, "there was discussion as to whether the major thrust here was to protect our present [bundled pricing] practices if we possibly could or to make a really objective sort," the minutes of that meeting read. It was decided to follow the latter course of action.

During that same meeting, "it was further pointed out that there were a great many factors, including competitive reaction, which could change the assumptions for this program," according to the minutes.

IBM recognized that once maintenance was unbundled from the CPU's base price, both the public and the DOJ expected a corresponding drop in that base price, the documents showed.

One document, titled "Rationale for Not Removing Profit From Machine Price," had a note on it: "Not for publication — internally or externally. For use with DOJ in answering questions on our price action."

IBM's task force on unbundling recommended that the base price reduction be calculated on the basis of "direct and direct-related costs of systems engineering, education and programming. elements which are being separately priced ... No attempt [should] be made to impute a past profit on these elements and that no consideration be given to including such imputed past profits in the base price reduction," the document said.

The document also covered legal considerations for a price reduction and noted that "Counsel has recommended a base price decrease on grounds of public and governmental reaction to the apparent arrogance of failing to make some price reduction in the face of widespread expectations."

IBM Raises Dividend 38 Cents; Stock Split Still Speculation

By Molly Upton
CW Staff

ARMONK, N.Y. — IBM shareholders will have some more change in their pockets following a dividend increase, but the question of a prospective stock split remains unanswered.

Directors increased the quarterly dividend on common stock to $2.88, up 38 cents over the previous $2.50 a share. The new dividend is payable March 10 to holders of record Feb. 9.

Although some predict a split of 5:1, a split on the order of 3:2 or 3:1 is more likely, according to Harry Edelson, senior analyst at the investment firm of Drexel Burnham Lambert, Inc. He observed the figure of $2.88 is divisible by 4, 3 and 2.

Splitting stock would benefit IBM in more than one way, he added.

For instance, a stock split could increase the number of shareholders by lowering the price of stock to within reach of a larger number of investors.

With IBM's entanglement in antitrust suits and its entrance into the communications area, regulation of some sort is an increasing possibility, he observed. "More than ever, IBM may desire public support. One way for IBM to gather that support is to broaden its shareowner base," he said.

In addition, a split would reduce the earnings per share figures, which are "embarassingly high."

"The little guy in the street owns a stock that earns 60 cents a share and then he hears IBM earns $20.75 a share and thinks IBM is earning too much money. He doesn't realize earnings is based on the number of shares and other factors," Edelson said.

"High per-share earnings doesn't sound so good in this age of consumerism," he noted, adding that most companies split when their figures get too high.

IBM has split its stock nine times since 1954, using a 5:4 ratio four times, 3:2 three times and 2:1 twice, Edelson observed.

The splits occurred when IBM's earning reached between $11.28 and $16.38 per share.

The last split was in 1973 with a 5:4 split reducing the estimated earnings per share from what would have been $13.49 to a realized $10.79 earnings per share after the split.

Prior to 1968, IBM stock generally split at two-year intervals. But the next split did not come until 1973, five years later.

After a split, the price of IBM stock traditionally has risen, he indicated. In eight out of nine times, the stock increased in value considerably after a split, Edelson stated. The exception was in 1973.

InSci
Information Science Incorporated
Personnel
Payroll
ERISA
EEO
OSHA

InSci Headquarters 95 Chestnut Ridge Road Montvale, New Jersey 07645 201-391-1600

Memphis TN 901 761-1845 Menlo Park CA 415 854-1903 Newport Beach CA 714 752-7672 Oak Brook IL 312 986-6460 Raleigh NC 919 781-6095 San Antonio TX 512 690-0110 Waltham MA 617 890-1516 West Palm Beach FL 305 689-8777

Member SIA Software Industry Association

Shift to Software Pricing Seen Growth Spur

By Molly Upton
CW Staff

NEW YORK — Although hardware prices are expected to continue to decrease, mainframers have several methods at their disposal by which they can increase their return on equity and raise the industry's earnings growth rate, according to a report from Kidder, Peabody & Co., Inc.

Investors' fears that profit margins and growth rates in the industry are going to erode over the longer term do not consider the future profit opportunities available, the brokerage firm's report stated.

By unbundling and shifting pricing emphasis to software as well as increasing modularization of both software, microcode and hardware, the mainframers can retain their proprietary edge while increasing profitability, the report said.

Other factors boding well for increased return on equity are the trend toward sale rather than lease of equipment and the increased offering and pricing of maintenance, according to William Easterbrook, a vice-president and author of the report.

With these trends, the computer industry's long-term earnings growth could increase to 12% to 13% from the current rate of 9% to 10%, if the current 80% earnings retention rate continues, Easterbrook observed.

And mainframers, able to provide a broad range of separately priced software, themselves could raise their return on equity by 10% to 20%, he commented.

Easterbrook expects the trend toward modularization and unbundling will alleviate investors' fears about margins because of declining hardware prices, which he dubbed "commodity-type pricing."

The firms that have the most to gain from the changeover in emphasis from hardware to software pricing are those with current high levels of profitability and large customer bases, such as IBM, Burroughs and Univac, the report remarked.

Mainframers' Territory

Focusing on the question of hardware profit margins among the mainframers, Easterbrook indicated the larger producers will be able to retain their margins over the intermediate term because the recent spate of price cuts has "primarily reflected cost reductions."

However, over the longer term, the growth rate of hardware profit should slow, he stated.

The new trends should help mainframers preserve their territory from further losses to plug-compatible makers and minicomputer manufacturers, according to the report. The brokerage firm estimated plug-compatible makers' shipments, including peripherals and CPUs, are running at about 20% to 25% of the total value of such shipments from IBM.

With the hardware market becoming more competitive, and with IBM and some other large mainframers seeing some of their "strong proprietary edge" eroding, they will be "less able to control the pace of development of new products and improvement in performance/price ratios than in the 1960s and early 1970s," the report stated.

But modularization and unbundling offer the opportunity to regain proprietary advantages:

- "Only the larger suppliers can afford the high cost of developing a comprehensive and sophisticated set of software modules."
- "Software is unique in that its incremental production cost is virtually zero ... Volume sales of software will provide even greater cost and flexibility advantages to suppliers than do volume sales of hardware."

The software supplier can obtain profit leverage by making some modules requisite to others and by controlling the interfaces among the modules and between the software and the hardware, Easterbrook commented.

"Changes in these interfaces, perhaps of a continuing nature, can create havoc for competing suppliers of individual parts of the total system that may not have the resources to supply all the parts of the system," he continued.

Large Revenues for IBM

Easterbrook's estimates of the revenues software could yield IBM are sizable. The firm's software product revenues are estimated at $400 million to $600 million a year, amounting to aobut 3% of total revenues. But he foresees software products, or microcoded functions now performed by software, generating as much as 40% to 50% of the firm's revenues within the next 10 years.

Hardware will also undergo a transition toward modularization and specialization of function.

Eventually, software and microcode modules could become largely tied to corresponding hardware modules, Easterbrook continued.

"Such 'associative modularization' would enhance the pricing flexibility of those manufacturers able to provide complete lines of the types of software and hardware modules that the user might desire.

"Furthermore, certain elements of hardware, microcode or software could be made interdependent so that one would be a prerequisite for another, thereby giving the supplier additional leverage," he observed.

Offers Cobol for DG Machines

IPI Sees Opportunity in CPU Independence

By Molly Upton
CW Staff

ORLANDO, Fla. — Hardware independence was one of the goals when Information Processing, Inc. (IPI) designed its own operating system and Cobol compiler for Data General Corp. equipment, according to Don Tyra, president of the software house.

A logical extension of that hardware independence is illustrated by the firm's investigation of other hardware on which it might also offer Cobol, Tyra said. "What held the minicomputer industry back was not lack of hardware, but the lack of business software," he stated.

Other firms offering Cobol for minicomputers tend to provide a batch version that uses the manufacturer's operating system, he noted. IPI's Blis/-Cobol, in contrast, was designed for a mulituser environment and has its own operating system.

Choice of Role

Why did IPI elect to remain a software house rather than market software in a bundled manner with hardware, as do systems houses?

There are lots of others who are good at selling hardware, and IPI feels its strengths are in the operating systems area, Tyra answered. In addition, he said, there is a need in the marketplace for good operating systems.

DG's fundamental RDOS was process control-oriented, whereas Blis/-Cobol represents a language and an operating system designed for business applications, he said.

"To date, software has been used by manufacturers to sell hardware," so they have no reason to offer software that spans a wide range of hardware or fits on the bottom of the line, he said.

"By not being involved with hardware, our software has got to stand on its own merits," he stated.

Range of Compatibility

The Blis/Cobol is upward- and downward-compatible within the DG line from the Eclipse to the Nova, he added.

The decision to remain a software house was also a marketing decision because IPI supplies systems houses or OEMs and in a sense would be competing with them if it handled hardware, Tyra observed.

IPI also avoids supplying applications programs, even to its OEMs, he said.

Tyra expects to see more independent hardware and software for IBM's Series/1 minicomputer. "In another couple of years the Series/1 will be like the System/3, with lots of independent offerings."

There is some irony in the fact that while IBM is taking the traditional minicomputer makers iron-only approach in marketing the Series/1, DG is acting more like IBM with the range of software it offers for the CS40.

Saw Need for Standard

In looking at the growth of the mini market, IPI saw that not every systems house could make an investment in developing language compilers and operating systems. The investment in applications programs indicated the need for a standard language such as Cobol, he observed, and that created the opportunity.

Although the technical staff of a system house would rather develop an operating system itself, management needs to get the product to market fast with software that is on the shelf, he continued.

Marketing manager Albin Dolney commented that the firm's Cobol is the Ansi 74 version. As an example of the interchangeability of Cobol programs from one machine to another, he cited one user who converted his programs from an IBM machine to a DG machine using Blis with changes in only seven items.

IPI currently supplies 60 OEMs or systems houses with Blis/Cobol for their DG systems and just under 200 users in the U.S. There are about 35 users abroad.

IPI ships out object code to prevent modification by the OEMs, Dolney said. In addition, each copy is identified so the firm can distinguish the copy from which any reproductions are made, he added.

Master File Kept

The firm keeps duplicate copies of the operating systems it has supplied and also adds new releases that provide more capabilities and/or accommodate different peripherals, Tyra said. With the master tapes at the home office, his staff can duplicate problems in the field and solve them, he pointed out.

Although IPI operates a hot line service to aid its OEMs, it has made only about three trips to the field, he said.

The 13-year-old firm was in the contract programming business until 1972, doing such work as multiuser systems for savings and loan institutions, warehouse control and work for the National Aeronautics such as programmable telemetry.

Tyra's background is in electrical engineering, but he found there was more to be done in the software arena than in the hardware area, he said.

THE NEW ERA IN MATRIX PRINTERS BEGINS WITH THE DATAPRODUCTS M-200.

Now you can get Dataproducts reliability in a low-cost 200-LPM Matrix Printer.

How did we combine the low-cost appeal of a matrix printer with high-performance, high-reliability characteristics?

First, we gave our M-200 Matrix Printer a dual-column, 14-wire head designed to fight heat build-up.

Next, we engineered our two-in-one head for a 300-million character life. About three years of normal use.

And any operator can change the M-200 head quickly and easily.

Then we set the replacement cost of our heads at less than $200 each.

Finally, we gave this New Era printer an average speed of 200-LPM (for 80 columns) and made it interface-compatible with all Dataproducts printers.

The M-200 table-top and pedestal models should require no more than two service calls a year and are designed to eliminate scheduled preventative maintenance.

All of which gives you the extraordinarily low price-performance ratio, low down time, and low life cycle cost you want.

Put our matrix printer in your line for a New Era in reliability and economy.

THE PRINTER COMPANY

NORTH AMERICAN SALES HQ: 6219 De Soto Avenue, Woodland Hills, CA 91365, (213)887-8451; Telex 69-8492.
EUROPEAN SALES HQ: Darmstaedter Landstrasse 199, Frankfurt, W. Germany, Phone 681034; Telex 841-416344.

Reality® was a tough act to follow. Introducing Royale.™

The newest family of small business computers from Microdata.

Following an act like our Reality data base management system was tough. But we've done it.

It's called Royale, the new family of Microdata computer systems designed for the expanding needs of your company.

The Royale family of true generalized data base management systems is a giant leap forward in power and responsiveness. It allows you to load more applications on your system than you ever could before without losing speed. And it allows you to add terminals up to the maximum of 32 without any appreciable loss of responsiveness.

The new Royale family of computer systems is totally software compatible from one end to the other. Covering a very wide range of capability. So as your company grows, your system can grow without losing anything you've already invested in hardware or software.

You communicate with Royale using the powerful, simple to use English™ inquiry language that works like everyday English. The system also includes easy to use RPG II high-level language and DATA/BASIC.™

Royale runs in an on-line, multi-programming, multi-user environment with all system resources and data files managed by a microprogrammed Virtual Memory Operating System.

And best of all, as your company grows, so can your system. You never have to throw away hardware or software. You simply add to what you've got as you need it. We've even protected our existing Reality customers by enabling them to upgrade their systems without losing their software investment.

All in all, Royale is a giant step forward in affordable control for the executive who is too busy running his company to let anybody else run his computer.

Before you decide on a data base management system for your company, contact your local Microdata dealer for a free demonstration of Royale. We think it's an act that's going to be impossible for anybody else to follow.

Microdata Corporation, 17481 Red Hill Avenue, P.O. Box 19501, Irvine, CA 92713. Telephone: 714/540-6730. TWX: 910-595-1764.

Microdata ROYALE™
The one to grow on.

Microdata
Authorized Royale Dealers

Anchorage	907/276-2431
Atlanta	404/266-8900
Boston	617/273-2920
Chicago	312/298-3840
Cincinnati	513/671-1888
Cleveland	216/621-1888
Dallas	214/358-2468
Denver	303/773-1510
Detroit	313/358-1950
Harrisburg	717/763-0850
Honolulu	808/523-1611
Houston	713/440-6111
Indianapolis	317/257-6555
Kansas City	913/321-7902
Los Angeles	213/685-8910 or 714/521-4041
Memphis	901/274-5960
Miami	305/565-0517 or 305/940-9994
Milwaukee	414/679-3127
Minneapolis	612/835-1000
Newark	201/964-6700
New Orleans	318/325-9618
New York	212/840-1555
Oakland	415/547-6565
Philadelphia	609/779-1901
Phoenix	602/275-7511
Pittsburgh	412/281-2676
Portland	503/245-6631
Raleigh	919/782-6020
Roanoke	703/563-4444
Rochester	716/436-2900
Salt Lake City	801/531-1122
San Diego	714/560-0777
San Francisco	415/697-0430
Seattle	206/641-4990
Spokane	509/624-1308
St. Louis	314/946-6757
Syracuse/Utica	315/797-8062
Tampa	813/879-5467 or 813/823-0591
Washington, D.C.	703/549-4300
Australia	(02) 922-3300
United Kingdom	0442-61266
Mexico	905-536-05-57
Nigeria	21361
Puerto Rico	809/844-3020
South Africa	48-0520
Toronto	416/362-1157
Vancouver	604/438-7361
Venezuela	45. 70. 15

Executive Corner

• Newly appointed corporate vice-presidents of Pertec Computer Corp. are Daniel R. Carter, vice-president and general manager, CMC Division; Ralph Gabai, vice-president and general manager, Pertec Division; George O. Harmon, vice-president and general manager, PCC Service Division; and Donald F. Orr, vice-president and general manager, Business Systems Division.

• Prime Computer, Inc. has announced the appointment of five new corporate officers. C. David Hetrick has been appointed vice-president, marketing development; Robert W. Vlastnik, vice-president, international operations; Robert G. Claussen, vice-president, domestic sales; Edward T. Cuddy, vice-president, production operations; and Russell E. Planitzer, treasurer. The posts are all new positions.

• John C. Sterling has been appointed vice-president, domestic marketing, and Ken Nelson has been appointed vice-president, international marketing, for Documation, Inc.'s newly formed domestic and international marketing organization.

• James Bruno has been named deputy manager of Perkin-Elmer Corp.'s Data Systems Group. Donald M. Becker has been named the division's president and general manager.

• Don Mattson has been appointed to the position of vice-president and product line manager, diskettes for Information Terminals Corp.

• Marijane K. McDonough has been promoted to senior vice-president and elected a director of Mini-Computer Systems, Inc. Arthur Garofalo was promoted to vice-president of sales and elected a director. Jean-Pierre Durant was named general manager for European operations. Roger Panton was named managing director of the company's UK subsidiary.

• Stephen M. Berkley has been appointed to the post of vice-president, business department, for Qume Corp.

• Douglas W. Smith, vice-president, data processing, telephone operations of GTE Service Corp., will succeed John B. Renwick as president of GTE Data Services (who has retired).

• Chuck Hall has been promoted to vice-president of product assurance for Documation, Inc.

• Walter P. Saltzman has been elected vice-president and general manager and James A. Zullo, vice-president of sales, for Applied Devices Corp., Instrumentation and Control Systems Division.

• Alice L.F. Pearson has been elected a vice-president and named general manager of Information Science, Inc.'s Eastern Division by the board of directors.

• Robert G. Bartizal has been promoted to executive vice-president of Dataproducts' printer and memory business.

• James Craig Ziegler has been promoted to senior vice-president while retaining his title of president at the Datacom Co., a subsidiary of Data Communications Corp.

•James M. Dismuke has been named vice-president and general manager of health care services by National Data Corp.

•Retired Rear Admiral Melvin T. Gardner of the Canadian Navy has joined Computer Science Corp., Europe, as vice-president for government systems based at the Brussels headquarters of the organization.

•James B. Brennan, Daniel L. Nussdorfer and Thomas N. Osterland have been elected vice-presidents of Interactive Services Corp.

•Kenneth J. Boekeloo has been appointed director of management systems on the corporate staff at Burroughs Corp.

•Robert C. Morgan has been promoted to vice-president, sales, for Sycor, Inc.

•Robert N. Tullos has been promoted to division vice-president, engineering, for the Pertec Division of Pertec Computer Corp.

•C. Dudley Warner has joined Boole & Babbage, Inc. as vice-president of hardware engineering.

• Richard K. Gerlack has been named vice-president, engineering, at Randal Data Systems, Inc.

• Milton Brandon Jr. has been elected executive vice-president and general manager of Statistical Computing Corp. David M. Nockels has been elected vice-president and assistant general manager.

• James McGuire has been named vice-president of operations for the Interdata division of The Perkin-Elmer Corp.

• Charles W. McCall has been appointed vice-president of sales at CompuServe. Robert J. Massey has been appointed vice-president, eastern division sales, Barry F. Berkov has been appointed vice-president of marketing services, and Jeffrey T. Weisner has been appointed controller.

benefit management?

Will your benefit software produce, on demand, 5500 data, an SSA, an ERISA Benefit Statement and a total management analysis of the real cost of all fringe benefits, per employee?

If it won't, ask Joe Nestor (617) 851-4111, Wang Laboratories, Lowell, MA 01851, about the new Wang Benefits Management Software System for 360/370, Honeywell and Univac.

Fringe benefits cost too much these days to neglect.

WANG

CENTRONICS
102A.. 330 CHAR/SEC TTL
103..... 165 CHAR/SEC LSI
INTERFACES FOR PDP-8, RS232, NOVA
IMMEDIATE DELIVERY

84-PAGE CATALOG • 1500 ITEMS
DEC, MINIS, PRINTERS, PERIPHERALS
SEND $1 FOR 1st CLASS POSTAGE/HANDLING

AMERICAN USED COMPUTER
CORPORATION
617-261-1100
P O BOX 68, KENMORE STA , BOSTON, MA 02215

IBM's High Court Plea Unfounded: Greyhound

WASHINGTON, D.C. — The Supreme Court should not review the Ninth Circuit Court of Appeals' order of a new trial in the case of Greyhound Computer Corp. vs. IBM, according to the Greyhound brief filed with the Supreme Court.

.The recent IBM request for high court review [CW, Dec. 12] should be denied because it contains no basis for Supreme Court review and ignores the facts of record that support the submission of the issues to a jury, the brief said.

The Ninth Circuit Court of Appeals [CW, Aug. 29] overturned a lower court directed verdict because of lack of evidence and indicated that there was sufficient evidence for the case to go to a jury.

The IBM brief asked the Supreme Court to overturn the appeals court decision on the basis that such a decision intimidates competition and burdens lower courts.

In its response Greyhound indicated the appeals court had appropriately determined leasing was a relevant market. The leasing firm labeled "specious" IBM's claims that the market under consideration is the EDP market.

"Not one witness at the trial agreed" to the existence of an EDP market and "indeed, there is uncontroverted, substantial evidence that the primary method of doing business in the industry is through the process of leasing computers," Greyhound said.

The EDP market, as defined by IBM, consists of all those firms that provide software and tabulating services; their annual sales or fees for DP services "have nothing whatever to do with the leasing of hardware or the manufacturing of hardware," according to Greyhound.

The Supreme Court has refused petitions of certiorari in four cases decided on similar grounds by the Ninth Circuit, Greyhound observed.

Contracts

Applied Digital Data Systems, Inc. (Adds) has an agreement with Modular Computer Systems of Fort Lauderdale, Fla., for the purchase of 1,000 Adds Regent Series CRT terminals.

Computer Automation's Commercial Systems Division has been awarded a contract from Woolco, Ltd. to install Syfa network processing systems. The systems will be used in the chain's franchised pharmacy operations.

MSI Data Corp. has received a major contract from Itel Corp. for more than $3 million worth of MSI's Source 7600 data entry terminals.

The Pertec Division of Pertec Computer Corp. has been awarded a $500,000 contract by Monchik, Weber and Associates, New York, N.Y., for Pertec's T7000 and T9000 tape drives for use on the Data Pad system.

Computer Sciences Corp. (CSC) has received a $2.2 million contract from the U.S. Navy's Pacific Missile Test Center, Pt. Mugu, Calif., for its software systems engineering and software managment services.

ICE, Inc. has been awarded two contracts totaling $60,000 annually to maintain five Data General-based minicomputer systems for the U.S. Navy and Air Force. The equipment to be maintained is located in Washington, D.C., at the Pentagon and other locations.

System Development Corp. has been awarded a $1.8 million contract to develop a Mortgage Insurance Accounting System for the Department of Housing and Urban Development.

Norand Corp. has reached an agreement with Agway, inc. to build a computer register system for Agway's retail store system.

Bradford National Clearing Corp. and the Pacific Exchange, Inc. have signed a letter of intent preliminary to a joint venture to provide automated trade DP and recordkeeping services for brokerage firms throughout the nation.

System Development Corp. has been awarded a three-year contract worth approximately $13.5 million to develop and operate a Medicaid Management Information System for the State of Florida.

National Data Corp. has received a contract from Welby Drugs to furnish its Deposit Reporting System.

Applied Devices Corp.'s subsidiary, Datatrol, Inc. of Hudson, Mass., has received an order from American Express for 300 merchant-activated credit authorization terminals called Datacat.

Raytheon Data Systems of Norwood, Mass., has been awarded a $400,000 contract for a multiprocessor-based system by Trans World Airlines. TWA will use the RDS-5000 minicomputer-based system as a communications data concentrator to reduce communications overhead in its central IBM 370s.

The Pertec Division of Pertec Computer Corp. has been awarded a two-year, $300,000 contract from Computervision of Bedford, Mass., to supply Pertec's T8000 tape drives for use in its interactive computer graphics system.

Sycor, Inc. has received a contract for 150 of its 290 on-line terminal systems by Computer Professionals Unlimited, inc. for use in its network of credit unions. The value of the contract is estimated at $800,000.

Computer Network Corp. has been awarded a contract under the General Services Program to provide teleprocessing services for the Federal Trade Commission over the next five years at a value in excess of $5 million assuming four one-year options are exercised.

System Development Corp. (SDC) of Santa Monica, Calif., has received a renewal of its contract with Cummins Engine Co., Columbus, ind., for on-line health-care claims processing using SDC's Claims Administration System.

Rand Information Systems has signed two contracts with the U.S. Civil Service Commission and the U.S. Veteran's Administration totaling approximately $2.6 million. Rand will transform the Civil Service Commission retirement benefits system and convert the VA's pension, compensation and education systems.

Introducing Shockwatch*

Rx
To prevent head crash, apply Shockwatch to all disk packs

A cure for the common headcrash

You don't swallow Shockwatch impact detectors. You put 'em on your disk packs. If a pack is dropped, Shockwatch turns bright red. So you can identify damaged media before they're inserted in a drive. And that cuts the probability of a costly head crash by up to 50%

Immunize your disk library against head crash. Ask your disk supplier about Shockwatch. Or call us at 214-350-5725. We're Detectors, Inc., a division of Media Recovery, 2550 Electronic Lane, Dallas, Texas 75229

Internationally, call your field engineering sales manager at the local Burroughs subsidiary head office

*Patent pending

SHOCKWATCH™
Protection.
Pure and simple.

If your company is buying High Isolation Transformers from one of our competitors, we'd like to know. So we'll give you a 13-function LCD pocket calculator to tell us about it.

Here are the rules:

1. Your firm must be an OEM using 25 or more of our competitor's products each year.

2. The transformers they buy must be controlled interwinding capacitance High Isolation Transformers with 125dB or greater common mode noise isolation.

3. You must be the first person from your company to call us at 800-854-2213 (Toll Free). If you are in California, call (714) 565-1155 collect. Ask for the HIT Department.

Our rep in your area will deliver the calculator to you personally and, as a bonus, describe Elgar's superior High Isolation Transformer ("HIT") product line, and the excellent OEM arrangements available.

If you're not using High Isolation Transformers, but suspect you may have a line noise problem, be sure to give us a call anyway. You won't get a pocket calculator but you'll sure get some answers!

ELGAR
8225 Mercury Court
San Diego, California 92111

HIT us for a free calculator

Elgar also is a leading manufacturer of Uninterruptible Power Systems AC Line Conditioners and AC Power Sources

At Least for Third World

IBM-India Debacle Offers Blueprint for Future

By Bohdan O. Szuprowicz
Special to CW

When IBM decided to pull out of India last November as a hardware manufacturer, its action was the the culmination of a 10-year-old struggle with the Indian goverment and domestic industry interests whose objectives were always the control of all possible aspects of India's computer industry.

But India is only one developing country where this occurred; already there are indications that other countries such as Indonesia, Brazil, Malaysia and even Nigeria are also eyeing 100%-owned foreign subsidiaries as fair game for their own form of "Indianization."

The IBM-India debacle may have just provided a blueprint for future action in other countries.

Although IBM's decision received a lot of publicity, India's action was not directed solely against IBM or even the computer industry. Coca-Cola and even British tea trading companies have had their share of Indianization problems.

It all stems from the enactment of India's Foreign Exchange Regulation Act (Fera) in 1973. Fera requires foreign firms operating in the Indian market to reduce equity in their Indian subsidiaries to 40% and permits 100% foreign ownership only in manufacturing firms whose output is destined exclusively for export.

IBM Very Vulnerable

IBM found itself particularly vulnerable, however, because unlike other computer hardware manufacturers it insists on 100% control of its foreign manufacturing subsidiaries. In an attempt to compromise, IBM offered to split its Indian operations into two separate companies.

It offered 60% equity to Indian interests in its computer service bureau business, but proposed to retain 100% control of its projected $10 million export manufacturing business as well as import marketing and service operations. The Indian government rejected this proposal and IBM decided to terminate its operations in India.

Out of a total estimated 350 computers installed in India, about 51% are IBM machines. About 100 of those are second-generation IBM 1401 computers, most of which were imported in form of second-hand parts which were refurbished and modernized at the IBM manufacturing plant in Bombay.

Indian user groups often voiced their displeasure at what they called the "dumping of second-hand computers in India."

As if in anticipation of the IBM decision, the Indian government was ready to take over the servicing and maintenance of all computer installations in India, having created a special Computer Maintenance Corp., which will step into the void as soon as IBM evacuates its forces, reportedly by May.

This government organization will be set up under the auspices of the Department of Electronics; its primary function will be to provide maintenance and support services to computer installations.

Control Over Future

The maintenance organization appears to possess much more say about the future of the computer industry in India than its modest corporate name would imply. Even supplies of spare parts, tools and test equipment for all imported and domestic computers will be channeled through the new organization.

The company is also to set up testing and evaluation facilities for peripherals, components and subassemblies. Another major activity will be "Indianization" of spare parts and components for existing computer installations, as well as redesign of installations to use domestic equipment whenever possible.

The company will also be heavily involved in systems

(Continued on Page 74)

11 Ways to Add to Your Computer Know-how

ADVANCED ANS COBOL
With Structured Programming
Gary D. Brown

Here's an in-depth examination of the complex statements that have evolved in COBOL programming. The book offers those familiar with programming—either in COBOL or another language—clear explanations and examples of such topics as: Table handline; Character-string manipulation; Report writer; Sort-Merge; Direct and indexed files; and Communications facility. The book's emphasis on advanced features, programming style and techniques, and structured programming makes expertise in COBOL easier to achieve.
(1-10642-9) 1977 497 pp. $19.95

MAKING SYSTEMS WORK
The Psychology of Business Systems
William C. Ramsgard

Innovative techniques for aliminating the "data pollution" affecting almost every ogranization today ara presented in this new book. It offers a detailed program for identifying specific system problems and developing a rational plan ot attack to effectively bridge the gap between system users and those responsible for tha system's care and operation. Many aids and guidelines help develop a tully useable information structure, including an in-house training program for the user, with specific recommendations for chief executive officers and their staff.
(1-01522-9) 1977 262 pp. $18.95

MICROPROCESSORS IN INSTRUMENTS AND CONTROL
Robert J. Bibbero

Discusses the relationship of the microprocessor with its host system—how they should be mated and interfaced, and what must be known and employed to launch the combination successfully. Bibbero provides all necessary background for applying modern microprocessors to instruments and control systems, assuming no previous knowledge ot eithar. He includes complete application case histories and describes softwara / firmware development for several systems. Emphasizes system and softwara development.
(1-01595-4) 1977 301 pp. $15.75

DATA COMMUNICATIONS
Facilities, Networks, And Systems Design
Dixon R. Doll

Here is a comprehensive, pragmatic guide to one of the information industry's most vital, yet least understood areas—data communications. This book reviews the basics of terminology, network structures, design tradeoffs, and the functions of typically used network building blocks, then axamines in detail important telecommunications services and facilities, both from economic and technical perspectives. Chapter-length coverage is given to present and future teleprocessing terminals…available arror control strategies for data communications links… and methods of sharing communications lines.
(1-21768-9) 1977 approx. 480 pp. $24.95

ABEND DEBUGGING FOR COBOL PROGRAMMERS
B. H. Boar

This comprehensive book presents a study of methodologies and techniques available to debug Abend (Abnormal Ending) core dumps—an event for which most COBOL programmers are inadequately prepared. Using the ANSI COBOL language under the 360/370 OS/MVT operating system as the case study, the book provides systematic approaches to Abends most tamiliar to the COBOL/OS user.
(1-08413-1) 1976 321 pp. $16.50

SOFTWARE RELIABILITY
Principles and Practices
Glenford J. Myers

Divided into four sections for easy reference, tha book discusses software reliability and tha major causes of unreliability; design of reliable software; the broad area of software testing; and the important factors related to development of reliable software, such as project organization, programming languages, predictive models, and software support systems.
(1-62765-8) 1976 360 pp. $21.25

EFFECTIVE USE OF ANS COBOL COMPUTER PROGRAMMING LANGUAGE
Laurence S. Cohn

This summary ot the latest applications of the ANS COBOL language eliminates the need to search through scattered texts and othar manuals. It offers a wealth ot practical tips that normally can be learned only through on-the-job axperience. More than half the book contains illustrations demonstrating each step in specific programming procedures. The tormat is designed for maximum practicality—from the detailed table of contents and extensive index to the spiral binding tor "hands-off" reference. An indispensable guide for programmers working with IBM's OS and DOS systems.
(1-16436-4) 1975 178 pp. $12.25

THE DATABASE ADMINISTRATOR
John K. Lyon

How can you realize the cost and efficiency benefits of centralized data management, while avoiding potential pitfalls? It's all spelled out in this unique guidebook. Lyon brings experience-tested techniques for system planning, start-up, and operation, and clarifies the special management skills needed by the Database Administrator in all phases of tha work. Detailed coverage focuses on dealing with hardware and software failures, timing and handling updating, managing growth, staff selection and management, security, and inter-department communication. Includes a wealth of illustrations and examples.
(1-55741-2) 1976 170 pp. $15.75

ALGORITHMS FOR RPN CALCULATORS
John A. Ball

Now calculator users can discover the vast computational power beneath their fingers when using one of the many hand-held calculators that use RPN. (Reverse Polish Notation). Here is an explanation of how to write concise and elegant algorithms tor specific individual needs and problems. Scientists, engineers, and students can numerically integrate differential equations, fit curves to data using least-squares techniques, solve transcendental algebraic equations, and evaluate many special functions (such as Bessel functions). An extensive collection of carefully written algorithms which can be readily used on any RPN calculator for solving a variety of common problems in science and engineering makes this an invaluable reference.
(1-03070-8) 1978 approx. 368 pp. $17.00

THE MINICOMPUTER IN THE LABORATORY
With Examples Using the PDP-11
James W. Cooper

Detailing the use ot the minicomputer for the acquisition and analysis ot laboratory data, this book describes in simple terms the programming of the DEC PDP-11 minicomputer. Examples and problems take readers through each phase of the programming language. The book also covers tha use of the computer as a tool for data acquisition and processing and includes a thorough discussion of signal averaging, spectrum display, plotting, and peak picking. Featured is the first tull description of the Fourier transform as implemented in a minicomputer.
(1-01883-X) 1977 365 pp. $19.50

Wiley Journal
SOFTWARE
—Practice and Experience
Editors: D. W. Barron and C. A. Lang

Publishes papers on "systems" software and "application" software for use in batch, multi-access, interactive and real time environments. Original contributions and tutorial papers.
Volume 6, Bimonthly Subscription: $75.00

WILEY-INTERSCIENCE
a division of John Wiley & Sons, Inc.
605 Third Avenue
New York, N.Y. 10016
In Canada: 22 Worcester Road, Rexdale, Ontario

Please send the books indicated for
15-DAY FREE EXAMINATION.
(Restricted to the continental U.S. and Canada.)
Mail to: WILEY-INTERSCIENCE
P.O. Box 092, Somerset, N.J. 08873

☐ Brown (1-10642-9)
☐ Ramsgard (1-01522-9)
☐ Bibbero (1-01595-4)
☐ Doll (1-21768-9)
☐ Boar (1-08413-1)
☐ Myers (1-62765-8)
☐ Cohn (1-16436-4)
☐ Lyon (1-55741-2)
☐ Ball (1-03070-8)
☐ Cooper (1-01883-X)
☐ SOFTWARE (Subscription)

☐ Payment enclosed, plus sales tax. Wiley pays postage/handling. We normally ship within 10 days. If shipment cannot be made within 90 days, payment will be refunded.
☐ Bill ma. ☐ Bill firm or institution.

NAME ____
AFFILIATION ____
ADDRESS ____
CITY ____ STATE/ZIP ____

Prices subject to change without notice.

092 A8479-57

Searching for Niche

Scope Focusing on Electrosensitive Printers

By Molly Upton
CW Staff

ORLANDO, Fla. — Scope Data is looking for a niche for its electrosensitive printers, according to Walt Plater, director of marketing. The firm is intent on developing faster, lower cost units, he indicated.

The Comm 1200 will be microprocessor-controlled and have bidirectional print speeds up to 500 char./sec while handling 1,200 bit/sec communications, he said. The existing Series 200 prints at 240 char./sec but falls somewhat short of handling 1,200 bit/sec capability, he said.

The new unit is being designed for a prospective customer involved in communications and wire services and will be marketed in lots over 1,000 in comparison with the firm's end-user marketing efforts with its Series 200, he said. Production is scheduled to start in the third quarter of 1978.

Although the major portion of the Series 200 base is used as hard-copy units for CRTs, Plater said the Comm 1200's target is the data communications market. The CRT hard-copy market is trending toward a lower cost unit, he added.

In distinguishing between impact and nonimpact printers, Plater said the latter type if suited for "rip and tear" applications — and that is what the firm is looking for.

Although thermal printers have been predominant in the "rip and tear" applications area, Plater said that probably thermal printers would not be as popular as they are if electrosensitive printers had been developed first.

Potential for Low Cost

Of all printing technologies, electrosensitive printing offers the potential to achieve the lowest cost, he said. That hasn't happened yet, but the potential is there, he added.

There have been many innovations in the field, and Plater expects more. He mused that if Scope had a model with styli spread across a page, the unit could print very rapidly. There is no reason why such a unit could not sell for less than $500, he added.

Paper about 4.5 in. wide could move almost silently, he added.

Because the cost of aluminized paper on the electrosensitive units is about 2.5 times that of plain paper, Plater prefers to compare operating costs between different types of printers.

He thus includes factors such as paper, ribbon, head replacement and service costs. The electrosensitive printers have no ribbons, he observed.

Although theoretically the cost of maintenance on electrosensitive units should be less than that for impact units because of fewer moving parts, Scope's use of a third-party firm dissipates the potential savings, he indicated.

The print head on the Comm 1200 will cost about $5, giving an amortized cost of 30 cents per million characters compared with the general figures of $1 per million characters for a matrix printer head and $1 per million characters for a ribbon.

"I feel the cost of supplies for the Comm 1200 will come close to if not be equal to or less than the total cost of supplies of an impact printer," Plater stated.

Scope is aiming for a mean time between failures of 8,000 hours for the 1200 as opposed to 4,000 hours on the Scope 200, he said.

Demand Increasing

Plater expects an increased demand for a 1,200 bit/sec unit. Currently the host area in the printer market is for 300 bit/sec units, he added.

Scope has not been without its problems, and although profitable sometimes, at other times has been dependent for sustenance on its parent holding company, Scope, Inc., a "miniconglomerate," he said. The firm has considered being acquired but rejected the idea, he added.

The initial product, the Scope 200, was designed to be flexible, and in fact was so flexible that it almost needed an engineer as a salesman, he said.

The flexibility included various word lengths, data rates, serial and parallel interfaces with CRTs, he noted.

Scope's new product, the Comm 1200, will be easier to interface, he said.

The firm got its start when Repco, another subsidiary of its parent, developed a printer. The product was designed by engineers rather than marketing people and although it was reasonably priced, it had shortcomings in reliability, Plater said.

Scope was subsequently established and spent 2-1/2 to three years redesigning and developing the current Series 200, which met with reasonable success in the market, he observed.

Over the years, paper has evolved from zinc oxide coated to aluminized. The coated stock generated residue and odor, especially at higher speeds.

Impressions on alumnized paper are made through vacuum deposition, he said. Early attempts to reduce costs by making the paper thinner resulted in paper that curled, he said.

Costs of special aluminized paper are decreasing, but Plater doubts that they will ever equal those of standard paper.

There's One Number for the Number One Computer Lease (703) 683-4606

Call Us.

We've been solving leasing problems for end users and brokers since 1967, longer than most leasing firms, and doing it better, too. CIG has been a leader in the lease/purchase field, offering a variety of flexible financing plans. Short-term or long-term leasing, Equity funding, Walkaways. There's a CIG plan to meet your needs.

Tell us what you need and we'll help you get it. With full financing, flexible leasing terms, the latest IBM/370 systems and plug compatible equipment, and a Technical Service Center which stands ready to help you get the most from your computer investment. Plus, we have a sizable portfolio of IBM/360 systems.

Whether for your own use or for a client, leasing through CIG can save you time and money—your two most precious resources. All negotiations are held in strict confidence for your protection. Our first quote will convince you . . . when you're talking leasing, you're talking our language.

Call CIG today (703) 683-4606.

CIG

CIG Funding Corp.
303 Cameron Street,
Alexandria, Virginia 22314

Call CIG: (703) 683-4606, or mail this coupon today

Tell me more about CIG. I am interested in
☐ leasing ☐ buying the following system:
____
I'm also interested in
☐ Memory Systems ☐ Block Multiplexer Channel
Name ______________________
Address ______________________
City __________ State ______ Zip ______
Phone number ______________________

Mail to CIG Funding Corp.,
303 Cameron St.
Alexandria, Virginia 22314

'Regulatory Maze' Seen Problem for U.S. Firms

WASHINGTON, D.C. — The U.S.' lack of a consistent national policy on technology transfer poses a dilemma for many high-technology companies, according to William S. Anderson, chairman of NCR Corp.

"Currently the U.S. has the most stringent controls over the export of high-technology products of any Western country. Yet lack of standard criteria and a jungle of conflicting interpretations make it extremely difficult for U.S. industry to assume a responsible position in the transfer of technology to Eastern countries," he said at a conference on "Technology Transfer in Transition."

As an example of the "regulatory maze" that sometimes confronts business, Anderson said the computer industry cannot export automatic bank teller machines (ATMs) containing data encryptors without first obtaining a license from the Office of Munitions Control.

"The fact that the National Security Agency has determined that this type of product is totally 'benign,' to use their own term, makes no difference," he said. "The drawn-out licensing procedure must nevertheless be followed.

"It is time to more clearly define the rules governing West-East technology transfer, to apply those rules consistently and to modify them when and if circumstances change," he said.

"There are encouraging signs that the government is beginning to move in that direction. Currently under review by the Department of Defense are more than 100 so-called critical technologies, to determine which of those technologies should be more closely controlled," he said.

"Meanwhile, the Department of Commerce's Office of U.S. Export Control is studying, on a country-by-country basis, both the risks and benefits of technology transfer.

"The Department of State is currently preparing for the next round of negotiations of the Coordinating Committee on East-West Trade (CoCom).

"And in Congress, the House Subcommittee on International Policy and Trade is holding hearings on the present export licensing process," Anderson said.

Industry Apprehensive

These efforts merit the support and cooperation of private industry, he continued, but added that there is apprehension on the part of private industry.

"We have a nagging fear that what will finally emerge from these somewhat overlapping efforts will be overregulation of technology transfer. If that happens, there is always the possibility that in curing the disease, the doctor will have killed the patient," he said.

As an example, he said "if the Department of Defense interim policy of requiring the licensing of critical technology transfer to *any* country prevails, the U.S.' competitive position in key world markets will be seriously jeopardized.

"In addition, such a course would raise other serious questions for which, to my knowledge, no answers presently exist.

"As only one example, suppose an overseas subsidiary of a U.S. company develops a so-called critical technology which it proposes to export. In such a case would that technology be subject to U.S. licensing requirements?" Anderson asked.

"One must also question whether the subsidiaries of U.S. multinationals can, over the long term, remain viable competitors with local companies if their U.S. parent is not allowed to transfer its technology to its subsidiary operations," he added.

"Certainly everyone concerned with the technology transfer process — and that includes government as well as business — needs a clearer idea of whether critical technologies developed for commercial products have contributed, or could contribute, to the military potential of a possible adversary. To date we have seen little evidence that they have ... "The Department of Defense has stated that insofar as West-East transfer is concerned, the fact that a given technology is obsolete by U.S. standards is beside the point," he said.

What matters is whether it would significantly advance the receiving country's military potential.

"Obviously, the determination of what constitutes critical technology is a crucial and still only partially answered question. The current listing, for example, includes technologies pertaining to memory, distributed data base systems, LSI circuits and plasma displays.

"In view of the widespread capabilities in these areas of technology, it is doubtful that their export by American companies would provide a competitive edge to potential adversary countries," he continued.

The Department of Defense acknowledges that it is dealing with a moving target, and says it will continuously update the list of critical technologies and/or end products whose export will require licensing in order to protect national security, he said.

"As new guidelines for West-East technology transfer are developed," Anderson said, "one hopes the developers will remember that this country's current technological edge in many industries is due — in large measure — to the fact that ours is still a relatively free and open economy."

The superb quality of Verbatim™ removable magnetic storage media is now on a dealer's shelf not far from you.

The reason Verbatim is now so accessible is that so many of you like the Verbatim idea: noticeably better quality and durability that show up in tough everyday use. The reason? We make almost everything ourselves, because we found that we could improve on the quality that we were getting from our suppliers.

Being demanding isn't always easy. But it's good for the people who buy and use Verbatim, and it's good for the scores of companies who specify Verbatim for the equipment they make. And we enjoy doing business that way.

Information Terminals Corp., 323 Soquel Way,
Sunnyvale, CA 94086 (408) 245-4400
TWX. (910) 339-9381.

In the Far East
ITC – Far East
404 Roppongi Skyheights
3-2-21 Roppongi, Minatoku
Tokyo, Japan
Telephone (03) 583-1981
Telex J 47879

In Europe:
Information Terminals S A
Case Postale 296
1215 Genève 15
Switzerland
Telephone 41 (22) 34-90-55
Telex. 22647 ITGE CH

For your nearest sales office call toll free (1) 800-821-3648
(in Missouri call 800-892-7655, Ext 515)

Ask for it by name.

Verbatim™

Dear Verbatim people
Tell me where my nearest Verbatim dealer is.

My name is ____________
Title ____________
Department ____________ Tel. ____________
Organization ____________
Address ____________
City ____________ State ____________ Zip ____________
And while you're at it, send me literature on ____________

Information Terminals Corp., 323 Soquel Way
Sunnyvale, CA 94086 (408) 245-4400
89-1-16-78

Mom would be proud of you for picking a data communications terminal system from Trendata.

There's such a selection. Not only in terminals and peripherals, but also in financing arrangements. We offer a variety of lease programs, straight purchase plans, even rental packages. Easy. Convenient.

You deal with one company that guarantees the product and backs it with nationwide service.

You can start with a small investment in equipment and later expand to more capacity without going through a financial hassle.

Our lease and buy programs are just as flexible as our terminal systems. Our equipment is designed to fit your people, our financing programs to fit your pocketbook.

They're both time savers you can really bank on.

Applied Magnetics
Trendata
610 Palomar Avenue, PO Box 5060
Sunnyvale, CA 94086
(408) 732-1790

Our terminal lease or buy programs fit everyone's pocketbook

Attention IBM 370 Sufferers

The 370 is a superb computer—but system bottlenecks can rob you of its full value. VS/Insight breaks bottlenecks, can improve total system performance.

VS/Insight is something rare in software – a monitor system that automatically records information on total 370 activity and individual program efficiency. VS/Insight is fully transparent – installs in minutes, involves no supervisor or IBM software modifications, operates with all releases of DOS/VS. It gives you detailed graphs and summary reports that analyze current hardware and software utilization, and also help you identify future system requirements. Teamed with our Job Accounting System, VS/Insight can significantly up-grade the overall efficiency of your 370 installation. Write or phone for detailed facts and a free trial offer.

datapro HONOR ROLL

We earned the DATAPRO AWARDS for our ASAP and RELO-PLUS systems

GSA CONTRACT NO. GS-00C-01200

UniversalSoftware inc.
Main Office: Brookfield Office Park, Brookfield, CT 06804
Tel: (203) 792-5100

Orders & Installations

Ross Systems, Inc., a Palo Alto, Calif., management consulting and computer time-sharing firm, has installed its second Digital Equipment Corp. PDP-11/70.

The First National Bank of Atlanta has an agreement with Incoterm Corp. for a pilot installation snd testing of five Incoterm Series 7700 automated teller machines in Atlanta.

The American-Press of Lake Charles, La., has ordered a total VDT system from Tal-Star. Computer Systems valued at about $500,000.

The Missouri Basin Power Cooperative of Bismarck, N.D., has ordered a Honeywell HS4400 process computer, high-performance video unit and printer valued at $2 million for its Laramie River Station project.

The U.S. Army has ordered from CFS, Inc. its proprietary software package Display Operator Console Support for worldwide installation.

Hertz Truck Division of the Hertz Corp. will install 14 NCR i-8250 computers at field offices throughout the country to handle processing of accounts receivable and billing.

Acco International, Inc. celebrated the first anniversary of the dedication of its World Headquarters with the installation of an IBM 370/138.

The Internal Revenue Service has purchased bulk-core memories from Honeywell's Process Control Division to replace magnetic drums.

Quality Mill Supply has ordered a Honeywell Information Systems Level 62 which will be used for on-line order entry and on-line accounts receivable applications.

Red Owl Stores, Inc. has signed an agreement to purchase $1.8 to $2.6 million worth of Datachecker systems from National Semiconductor Corp. for its chain of food stores.

Empire National Bank of Newburgh, N.Y., has ordered Quantor Corp.'s first Q118, a minicomputer-controlled computer output microfilm (COM) recorder/processor.

Helms Express, a N. Huntington, Pa., trucking firm, has installed a Harris 8182 intelligent CRT system valued at $50,150. The system operates on-line to an IBM 360/40 mainframe.

The First Citizens Banks and Trust of South Carolina has begun installing a statewide NCR electronic DP network valued at $2.3 million.

Oxford Savings Association of Oxford, Ohio, has installed Most (Mini On-Line System Technique), a software package developed by NCR Corp. to cover aspects of a savings and loan association's operation.

The R.L. White Co., a real-estate-oriented publishing firm headquartered in Louisville, Ky., has ordered dual Honeywell Information Systems Model 66/05 large-scale systems valued at $1.8 million.

Nyman Mfg. Co., a paper and plastic product manufacturer, has ordered a Univac 90/30 system for installation at its E. Providence, R.I., plant.

Wetterau, Inc. of Hazelwood, Mo., has agreed to purchase over $1 million worth of National Semiconductor Corp.'s Datachecker point-of-sale systems over the next three years.

Airco, Inc. of Union, N.J., has installed Pertec's CMC 1800 Keyprocessing system.

Colonial Penn Group Corp. of Philadelphia has ordered Incoterm Corp. SPD 300 series equipment valued at $2.9 million.

National Family Opinion of Toledo, Ohio, has installed a Honeywell 64/50 computer to tabulate and analyze consumer market research surveys.

Baltimore's Franklin Square Hospital has installed a Harris 8170 intelligent CRT terminal system, for admission, emergency, outpatient and billing applications. The system is valued at $182,000.

Inter-Regional Financial Group, Inc. has purchased Digital Equipment Corp.'s Decsystem-20 to be installed in the Minneapolis offices of Dain, Kalman & Quail, a regional investment firm. The system is valued at $600,000.

The City of Rialto, Calif., has ordered a Honeywell Level 62 computer valued at $160,000.

The U.S. Marine Corps has received the first two Control Data Corp. MD640 militarized mass storage systems for integration into its Magis Intelligence Analysis Center. Additional units are to be delivered under a $415,000 contract for various uses within the Marine Tactical Command and Control Systems Group.

Sportcaster, a ski apparel manufacturer in Seattle, has ordered a Honeywell Level 62 business computer for sales order processing, payroll, accounts payable, accounts receivable and general ledger applications. The system is valued at $280,000.

The U.S. Department of the Treasury has ordered dispersed data processing systems and services from Datapoint Corp. The equipment will support the Treasury Payroll/Personnel Information System. The order is valued at approximately $1.9 million.

The Hospital Trust National Bank of Providence, R.I., has installed an IBM 3890 document processor. The 3890 operates on-line to an IBM 370.

U.S. Home Corp. of Clearwater, Fla., has ordered a Honeywell Model 64/30 computer system valued at $550,000 for financial applications.

Florafax International, Inc. of Tulsa, Okla., has ordered 1,000 low-speed asynchronous modems from General Datacomm Industries, Inc. to implement System XXi, a nationwide order transaction and management information system for the floral industry.

Ohio's School Employees Retirement System has installed a Honeywell Model 66/05 computer valued at $1 million. The system will be used to process statewide nonacademic employee benefits for both active and retired members of the Ohio public school system.

Cabarrus County, N.C., has ordered a Honeywell 64/20 computer to be used initially for property tax computations and financial management applications. The system is valued at $330,000.

Western Electric Data Center of Illinois has installed three Memorex 1380 communications processors.

HAZELTINE 1520: A BREAKTHROUGH IN PRINTER CONTROL

The Hazeltine 1520 is truly remarkable, with features found in no other terminal in its price range. A microprocessor-based editing terminal with extended system flexibility, the Hazeltine 1520 has a unique, buffered interface for controlling a slave printer with either a parallel or EIA serial interface.

Independent Operation
The Hazeltine 1520 uses two microprocessors, one dedicated to the terminal functions and one for the printer interface, allowing your CPU to interact with the terminal and printer independently. What does this mean to you? It means that an operator can be entering data through the terminal to the CPU while the printer is receiving and printing information from the CPU totally independent of the terminal function.

Printer Buffer
The Hazeltine 1520 has a separate 2K printer buffer. Data communicated from the CPU to the Hazeltine 1520 printer interface at high baud rates are buffered down to the printer's speed. This allows you to attach a low-speed and perhaps low-cost printer to a high-speed communications system.

Transparency
The Hazeltine 1520 permits data to flow through from the CPU to the printer without any change. You are not limited to formatting printed output, in accordance with the CRT display (typically limited to 80 columns). Printing is limited only by the printer's own capabilities. The terminal is transparent between your CPU and printer.

Hard to believe that all of these unique features can be found in one low-cost terminal? Call your local sales representative today for a demonstration.

Hazeltine

Hazeltine Puts Performance Into Economy Terminals.

Hazeltine Corporation, Computer Terminal Equipment, Greenlawn, New York 11740 (516) 549-8800 Telex 96-1435

Innovative Marketing Seen Micro Use Key

WOODLAND HILLS, Calif. — Innovative distribution techniques will be almost as important as innovative products in achieving the predicted high level of microcomputer use, according to Don M. Muller, senior vice-president for the Microsystems and Peripherals Group of Pertec Computer Corp.

"The very low-priced microcomputer, intended for a fairly narrow range of home uses, will be sought out by the public in retail stores. But the middle-range microcomputers with broad capabilities, designed for small businesses, will have to be merchandised aggressively and imaginatively if the industry is to achieve the high sales figures many observers are expecting," Muller said.

"What's needed is a showroom where the salespeople can demonstrate various pieces of equipment and show how they would help with each businessman's particular problems," he said.

Most retail microcomputer stores today are oriented toward the hobbyist and are looking for the quick sale with a lower level of after-sale support.

"We are interested in near-term success, too. We offer a line of hobbyist products through the Icom label, but we also concentrate a great deal of attention on our long-range goal of a well supported line of small business systems as solutions to the problems of the very small business," the Pertec official noted.

"Careless sales today will cause the industry grief tomorrow, and we are developing a support plan carefully tailored to assure the user gets what he needs."

"That's why we're concentrating on business applications more than home or hobbyist usage, and that's also why we're using dedicated stores to penetrate the small business market," he said.

Expansions

Sycor, Inc. has selected a 21,000 sq-ft facility in Goldsboro, N.C. The company has also occupied another 14,000 sq ft of office space in Ann Arbor, taken an option on an additional 10,800 sq ft of office space there and activated 20,000 sq ft of space in a newly constructed Ann Arbor warehouse.

Vadic Corp. has moved into a new 95,000 sq-ft plant on a 5.3-acre Moffett Industrial Park site in Sunnyvale, Calif.

Tandon Magnetics Corp. has doubled its plant size with the addition of a new facility in Chatsworth, Calif.

Wang Laboratories, Inc. will build a 126,000 sq-ft addition to its facility in Tewksbury, Mass., to be completed next summer.

Processor Technology, Inc. has moved into a new facility at 7100 Johnson Industrial Drive, Pleasanton, Calif. 94566.

Syncom, Inc. has plans to expand its present facility to 60,000 sq ft. The company is located in Orchard Park, N.Y.

Tesdata Systems Corp. has relocated its corporate headquarters and consolidated a number of satellite operations into its own 84,000 sq ft office building at the Westpark Center in McLean, Va. Initially the firm will use appoximately 50,000 sq ft of the modern seven-story structure.

'Debacle' Offers Future Blueprint

(Continued from Page 69)

engineering, import procurement advice, central purchase of peripherals and optimization of systems. It will also carry out research and development and play a vital role in software and systems support, software development, programming, feasibility studies, DP management and data center organization.

Further down the line, the unit is to set up computer centers for the Indian government, the public sector and for industry as required.

Soviet Protoype

The organization displays many characteristics similar to those of Elektronorgtekhnika of the Soviet Union, a unit of the Ministry of Foreign Trade of that country which has the monopoly on import and export of computer hardware, software and components.

Some of the Indian concepts must have undoubtedly originated from a study of Elektronorgtekhnika, with which India has had considerable dealings.

In fact, there are already eight known Soviet computer installations in India, more than in any other coutnry outside of Eastern Europe. Besides the Soviet BESM-6 at the Bhaba Atomic Research Center in Bombay, there are also Riad R-30 and Minsk-22 computers at the Indian Institute of Technology and another Riad R-30 at the Administrative Staff College of India.

An East German Riad R-40 is installed at India Engineers Ltd.

In 1975 the Soviet Union and East Germany supplied 20% of India's office equipment imports of $12 million. This was the result also of the surplus rupee trade with the Soviet Bloc, but there have been reports the Soviets offered to supply the know-how to manufacture in India Riad computers, which are comparable to IBM 360 and some 370 models.

Since 1972, India also has been manufacturing its own minicomputers, of which 75 units are already installed, accounting for about 21% of all computer installations. These include the TDC-312, TDC-316 and TDC-332 models, the latter a 32-bit minicomputer whose prototype is expected to be in operation in 1978.

In addition, up to four Indian firms are trying to develop microprocessors and in 1975 an Indian microcomputer with 36 functions was announced. Its production was expected to save India another five million rupees annually in import.

Other developing and populous countries are the most likely to undertake "Indianization" of their fledging computer industries. This is so because many are traditionally short of hard currencies and have high unemployment while manufacture of electronics and computers is a labor-intensive industry with relatively small demand for materials input.

Brazil is already requiring local investment and local sourcing in manufacture of small computers, which keeps IBM out and forced foreign firms such as Philips, HB-CII, Fujitsu, Nixdorf and Nippon Electric to join with Brazilian interests in making the proposals.

Malaysia has announced that by 1990 foreign firms can retain only 30% in their subsidiaries. Indonesia has proposed that marketing be performed by local firms [CW, Jan. 9] and even Nigeria is demanding a share for its domestic investors in its local IBM subsidiary.

"Indianization," it seems, is the wave of the future — in the Third World at least.

Send for a free job accounting evaluator.

Our generalized requirements checklist will put your needs in focus. It was developed from PACER's 8 years of experience with several thousand job accounting users.

Whether you are considering vendor supplied or in-house solutions, your research will not be complete until you include KOMAND in your evaluation. Not limited to just SMF, KOMAND puts you in control of the resources of your OS/VS system. KOMAND is cost conscious, flexible, and systems and operations oriented. Your KOMAND system can range from a $5900 costing and reporting module to a total system including formal invoicing, DASD track-hour accounting, and statistical analysis.

KOMAND BY PACE

OS/VS Job Accounting and Billing System

PACE Applied Technology, Inc. Telephone (703) 369-3200
7900 Sudley Road, Manassas, VA 22110

Name________________ Title________________
Company________________ Phone________________
Address________________
City________________ State________________ Zip________
Computer________________ Operating System________________

The PACE for Today...and Tomorrow

AKD (402) 392-2606
VOLUME DATA ENTRY SERVICES . . . TAPE OR CARDS
"QUALITY AT A LOWER COST"
AMERICAN KEYDATA
Mid America Plaza, Suite 144
7171 Mercy Rd., Omaha, Ne. 68106

EDP Consultants

THE SOUTHEAST DIRECTORY OF COMPUTER INSTALLATIONS

Show and Tell.

To learn more about computers at any level, you have to hear. Discuss. Ask questions. Share ideas. Watch things work.

Computer shows dot the map every year. But Computer Expo 78 is different. An exhibit showing you all that's new. A conference telling you about new ways to use it.

The Show.

The Exposition. Your chance to hold a one-to-one consultation with hundreds of representatives in the know from the nation's top manufacturers. You don't have to travel all over. They're coming soon to a city near you.

And the Show is free! Including exhibitor seminars and demonstrations of the latest developments in:

Data Communications Terminals • Software • Minicomputers • Data Input Equipment • Computer Output Equipment • Supplies • Magnetic Media • Modems • DP Education • Small Business Computer Systems • Flexible Disk Drives • Data Communications Interconnect Equipment • Mini-peripherals • Magnetic Tape Transports • Cassette Systems • Power Supplies • Printer Terminals • Keyboards. And more.

Ask your questions. State your needs. Discuss your plans. This low-key, non-selling atmosphere is your chance of the year to compare what's on the market, all in one place. As sophisticated or as simple a show as you need. You're the center of attention, whatever your level.

You're important enough to bring top people from all over the country to you. Find your show dates here:

ANAHEIM	March 21, 22, 23
Southern California Computer Expo	Disneyland Hotel
SAN FRANCISCO	March 28, 29, 30
Northwestern Computer Expo	San Francisco Civic Auditorium
HOUSTON	April 11, 12, 13
Southwestern Computer Expo	Astrohall
ATLANTA	April 18, 19, 20
Southeastern Computer Expo	World Congress Center
ST. LOUIS	April 25, 26, 27
Gateway Computer Expo	Gateway Convention Center
CHICAGO	May 2, 3, 4
Midwestern Computer Expo	McCormick Place
NEW YORK	May 9, 10, 11
Mid-Atlantic Computer Expo	New York Coliseum
DETROIT	May 23, 24, 25
Great Lakes Computer Expo	Cobo Hall
BOSTON	May 30, 31, June 1
New England Computer Expo	Northeast Trade Center

COMPUTER CARAVAN'S

COMPUTER EXPO 78

The Tell.

The Conference. Computer Expo's Conference takes place from 9 AM to 1 PM, leaving your afternoons free for the Exposition. The Conference includes keynote speeches, case studies, presentations, panel discussions and workshops. All put together by experienced conference planners, making this the most respected conference in the country. Well-known authorities—consultants and users—will share experiences, ideas, insights and foresights with you.

These are days that will bring you facts you need *now*, to put to practical use *now*. No frills, no fluff.

Whatever your level, you'll find at least one of these days a must:

Tuesday

For you on the executive level, dealing with data processing personnel, problems, payments, plans.

The Executive Briefing.
A keynote speech, "Strategic Systems Planning: a View from the Top." Case Studies on Data Base and the Executive; Potentials of Distributed Data Processing. Presentations on Trends and Opportunities in System Financing; The Computer Resource of the Future.

Wednesday—Simultaneous Double-Conference

For you who are bringing in a first computer system for a small company, or are involved in light inhouse computer use—maybe about to trade up—or just thinking about your own system.

Small Business Systems.
A keynote speech, "Data Processing in Small Business Today." Case studies on Computer Uses in Financial Reports; Computer Uses in Operations Planning and Reporting. Presentation on How to Negotiate with Vendors. Day-end panel that includes you, your questions, views and comments.

For you who interface with computer personnel on a day-to-day basis and need to anticipate, communicate, elicit their best work.

Managing People Problems.
A keynote speech by an expert in managing data processing personnel. Case Studies on Career Pathing for Operators and Programmers; Improving the User/DP Relationship. Presentations on Testing for DP Competence; Coping with Security/Privacy Regulations.

Thursday

For you, the manager or technician whose organization is thinking of distributing its computer resources to regional offices and plants.

Distributed Data Processing.
A keynote speech, "Critical Issues in DDP." Case Studies on Applications for DDP; Equipment Selection. Presentations on Networking Aspects of DDP; The Data Base Question.

Take one, two, or all three days.
Send yourself. Send your key personnel.
The Exposition is free.
The Conference is just $55 per single day, only $135 for all three days.
Register now.
For the Show.
And for the Tell.

Write to
Conference Chairman
Computer Expo 78
60 Austin Street
Newton, MA 02160

Save time! To register, to get more information or for your free advance tickets to the Exposition, call TOLL FREE: 800-225-4242. (In Massachusetts, call collect: 617-964-4550.)

DG Revenues Gain 47% in Quarter

WESTBORO, Mass. – Data General Corp. posted a 47% gain in revenues and an increase in earnings for the first quarter ended Dec. 17.

Revenues reached $75.3 million compared with $51.1 million in the same period last year. Earnings totaled $8.2 million or 82 cents a share compared with $5.7 million or 58 cents a share in the same quarter a year ago.

Amounts relating to fiscal 1977 were restated to include the results of Digtal Computer Controls, Inc. (DCC) on a pooling-of-interests basis.

Over the past five years, the firm's income from operations has ranged between 20.3% and 21.1% of net sales and net income has ranged from 10.9% and 11.6 % of net sales, President Edson D. deCastro indicated in the firm's annual report.

DG's cost of goods sold is 47.1% of net sales, which deCastro said is among the lowest of the small computer industry, while its expenditures on research and development are the highest, 10.2% of net sales. The firm now makes about 80% of its product, he added.

Financial News

Through its expansion program, DG facilities occupy almost 1.5 million sq ft. Another 690,000 sq ft is under construction in Massachusetts, Maine and North Carolina, deCastro indicated.

To provide capital resources, the firm raised $60 million last September through the sale of sinking fund debentures.

DG's employment at year-end totaled 8,590. About 500 are in R&D; there are more than 420 sales engineers and 219 systems engineers devoted to the marketing effort. Field engineers totaled 857 after a 60% increase during the year, the report stated.

The firm promoted almost 1,000 employees in the assembly, inspection, technical and clerical areas.

DG has upgraded its training for manufacturing assemblers to a certification program under the supervision of the Corporate Manpower Development and Quality Assurance department, the report said. More than 1,500 field and field support people participated in formal courses during the year.

Looking at the balance sheet, the DG report stated management thinks the firm's business operations "are affected by a number of economic factors including, for example, changes in levels of spending by industry for capital equipment and availability of capital. Therefore, past results should not be considered indicative of future results."

During 1977, the firm's sales totaled $254.7 million and earnings totaled $28.6 million.

The firm had shipped a cumulative total of 44,500 computers by Sept. 24, 1977, an increase of 10,600 over fiscal 1976. The increase in employment totaled 2,400. The statistics for the years 1977 through 1973 were restated to include the acquisition of DCC.

The firm's total current assets were $236.4 million while total assets, including property, plant and equipment, amounted to $273.3 million in the year ended Sept. 24, 1977.

Beehive Posts Mixed Year

SALT LAKE CITY, Utah – Although Beehive International's 1977 revenues set a record, earnings declined.

"Corrective action has been taken and we can see marked improvement already, but it is going to take a period of time to completely work our way out of the effect of these problems," according to President Warren Clifford.

The underlying problem of inventory cost adjustment will have a continuing effect through at least the first quarter, he added.

Revenues for 1977 rose to $20.5 million compared with $12.6 million in 1976, but earnings declined to $653,277 or 62 cents a share compared with $763,710 or 81 cents a share in the previous year.

"Recent new product introductions should reestablish the previously attained profit margins later in the fiscal year 1978," he said.

Presenting the most dynamic business Opportunity since the Big Mac.™

A National ComputerLand Retail Franchise

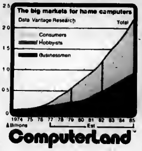
In 1967, you could have made a fortune selling burgers. Now, there are personal computers. Possibly the greatest opportunity since.

THE MARKET. Today, annual sales of microcomputers are over $100 million. By 1985, that total may top the $2 billion mark.

THE OPPORTUNITY. A ComputerLand retail franchise lets you in on this explosive market. The package includes everything you'll need: turnkey business system, intensive training, central buying and warehousing, national advertising. . . And more.

THE QUALIFICATIONS. Interest in microcomputers comes first. Next, desire to test your management and sales ability. Finally, an investment of about $100,000 for a fully stocked and outfitted store. Bank financing available for qualified applicants.

INTERESTED? Join our rapidly growing national franchise network. 24 stores now open. Key locations still available. Call (415) 895-5363 for instant action. Or, send the coupon for a detailed brochure.

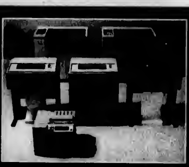


ComputerLand

Big Mac is a trademark of McDonald's Corp

Mail to E. E. Faber, President, ComputerLand Corp., 1522 Republic Avenue, Dept. CW
San Leandro, CA 94577 (415) 895-9363

Name Occupation
Address City
State Zip Phone



WE HAVE A LINE PRINTER FOR YOU.

If you want to save 30 to 50 % of printer costs.

[illegible]

BDS [illegible]

NOTICE TO BIDDERS

City of Philadelphia Water Department. Water Pollution Control Project. Southwest Water Pollution Control Plant. Additions and Modifications - Phase XI Process Computer Monitoring and Control System. Bid. No. 2514 - Division 34 - Equipment and Electrical Work No. SO-522-SW.

Sealed proposals for Additions and Modifications - Phase XI under Work Number SD-522-SW of the Southwest Water Pollution Control Plant Improvements, invited by the Procurement Commissioner, will be received in Room 1385, Municipal Services Building, on April 4, 1978 at 2:30 PM Prevailing Time, at which time and place they will be publicly opened and read aloud.

The work for which Proposals are invited includes the designing, furnishing, and installation of the Process Computer Monitoring and Control System, and all related and appurtenant work.

The Contract Documents, including Instructions to Bidders, Proposal, Federal Requirements, Contract Requirements, Specifications and Plans, may be examined in Room 1360, Municipal Services Building, Philadelphia, Pennsylvania and at the office of Greeley and Hansen, Six Penn Center Plaza, Room 310, Philadelphia, Pennsylvania. Copies of these Contract Documents may be obtained from the City only upon the deposit of a check for $250.00 for each set. The amount of the deposit for each set will be refunded if the documents are returned in good condition within 14 days after the opening of bids.

Each Proposal must be accompanied by a certified, bank treasurer's or cashier's check on a solvent bank or trust company, drawn to the order of the City of Philadelphia, in accordance with Clause 6, Security for Execution of Contract, of the Standard Contract Requirements. This sum is a guarantee that, if the Proposal is accepted, a contract will be entered into and its performance properly secured.

No bid will be accepted unless the standard "City of Philadelphia Questionnaire and Financial Statement for Qualifying Bidders" and the Supplemental Bidder Prequalification Documentation, with all questions fully answered, have been filed with the Water Commissioner in Room 1180, Municipal Services Building, at least sixty (60) days prior to the date of opening bids.

In regard to nondiscrimination in employment, Bidders on this work will be required to comply with the President's Executive Order 11246, as amended, and the Affirmative Action Programs/General Procedures. The requirements for Bidders and Contractors under this Executive Order and the Affirmative Action Programs/General Procedures are explained in the Contract Documents. No bid will be accepted unless it includes a complete "Affirmative Action Plan" (Philadelphia Plan) for equal employment opportunity, in accordance with the Appendix to the Proposal.

Grantees on Federally-Assisted Construction Contracts will be required to comply with the Federal Requirements and Contract Provisions for Work under the Federal Water Pollution Control Act Amendments of 1972, which are included in the Contract Documents.

Any Contract or Contracts awarded under this Invitation for Bids are expected to be funded in part by a grant from the United States Environmental Protection Agency. Neither the United States nor any of its departments, agencies or employees is or will be a party to this Invitation for Bids or any resulting contract.

The Procurement Commissioner reserves the right to reject any or all bids or to waive any informalities and to accept the bid which he deems most favorable to the interests of the City of Philadelphia, after all bids have been examined and canvassed.

OTTO R. WINTER
PROCUREMENT COMMISSIONER.

POSITION ANNOUNCEMENTS

Operating Systems Programmer

We have an immediate opening for an Operating Systems Programmer who is experienced in file subsystem and implementation of a general input/output manager. This individual will be responsible for the design, implementation and documentation of the standard input/output manager on the STAR 100 computer. BS/MS in Computer Science or a related discipline and a minimum of 2 years assembly language experience on large scale systems are required. For immediate consideration, send resume to K. Hardy, Dept. 40-A, 215 Moffet Park Drive, Sunnyvale, CA 94806.

CONTROL DATA CORPORATION

An Affirmative Action Employer M/F

FACULTY POSITION: MATHEMATICS AND COMPUTING SCIENCE

One position in the tenure stream at the Assistant Professor level, starting September 1, 1978; salary negotiable. Ph.D. strongly preferred; applicants should have strong background in applied mathematics and computing sciences and demonstrate continued commitment to professional development. Experience should include college teaching and/or industrial experience in a computer environment. Responsibilities include: undergraduate teaching in such areas as Data Processing, Operations Research, Modeling and Simulation, Assembly Language (DEC-10), and Numerical Analysis; assisting with the development of undergraduate computer science research projects. Eight month academic year with limited opportunity for spring and summer teaching. Deadline: March 31, 1978. Send resume to Dr. H.D. Callihan, Search Coorindator, Mathematical and Computing Sciences Department, University of Pittsburgh at Johnstown, Johnstown, PA 15904. UPJ is an Equal Opportunity/Affirmative Action Employer.

TELECOMMUNICATIONS SOFTWARE DESIGN

CALL TOLL FREE, (800) 323-1966

In Illinois (800) 942-0491

Monday thru Friday from 8 am to 5 pm cst

A short time invested in reviewing the opportunities at GTE, could pay career dividends for years to come. The telecommunications programs underway at GTE Automatic Electric Laboratories span the various segments of the science . . . from long range research beyond the limits of today's technology, to prototype development and systems simulation. If you have skills in one of the areas below, spend a little time with us.

SOFTWARE DESIGN ENGINEER

Responsible for the specification, design and testing of telephone systems support software, network and control software, or maintenance and diagnostics software. Prefer a minimum of 3 years' experience in structured design, coding, testing and documentation of programs; development with large data base on multi-file computers and real-time systems, HIPO design documentation, TSO usage and software simulation techniques. Requires a BS or MS in Computer Science or Electrical Engineering and specialized study in the use of PL/1, Fortran, Assembler, Intel 8080 and PDP-11 programming languages.

DATA BASE DESIGN

This position requires a minimum of 5 years' experience in the planning development, design and implementation of data base software, including data base management systems administration. Your primary responsibilities will be the development of data base system for a large on-going project including the implementation, support and administration of systems.

TELETRAFFIC & PLANNING ENGINEER

Responsible for the analysis of teletraffic probability and queuing problems on digital and analog switching and the development of computer programs for switching systems. Perform control and route reliability studies, define and analyze problems for future systems features and their applications. Prefer a minimum of 3 years' experience in real-time control systems teletraffic problems, systems equipment quantities specificiation, and exposure to switching system specification. Requires a BS or MS in Electrical Engineering, Computer Science or Math and a strong statistical background and experience in PL/1 or Fortran programming and model simulation.

MINI-COMPUTER PROGRAMMERS

We have specific assignments available on project development teams responsible for the design implementation of various telecommunication processing systems utilizing minicomputers as the processing element. Responsibilities will include the development of software programs for real-time operating systems as well as unique hardware elements incorporated into the systems.

If unable to call send resume including recent salary history to:

Manager of Technical Employment
Dept. 471 A6
GTE AUTOMATIC ELECTRIC LABORATORIES
400 N. Wolf Road
Northlake, IL 60164

An Equal Opportunity Employer M F

PRODUCT MGR EDUCATION

This position involves both teaching and administration in dynamic new computer division of National CSS, headquartered in Fairfield, Connecticut.

Requires several years previous experience in developing, teaching and administering courses in a computer hardware and software related area for a mainframe or minicomputer system with sophisticated software.

Will develop programs for training, sales and technical marketing personnel in hardware concepts, competition, software products, fundamentals of finance and proposal writing, systems analysis, and industry familiarization. Will coordindate activities of others for assistance in course preparation.

Technical personnel trained through the above programs will in turn train customers and prepare for hardware installation.

Here, employees enjoy a competitive salary and fringe benefits package. For prompt consideration, please forward your resume including a copy of this ad, to:

Nancy Potenza
National CSS, Inc.
Computer Division
542 Westport Avenue
Norwalk, CT 06851
An Equal Opportunity Employer

SAN DIEGO OS/VS SYSTEMS MAINTENANCE PROGRAMMERS

Systems programmers! This is your opportunity to join a highly technical systems programming team in sunny San Diego. We are currently looking for a Professional highly skilled in the generation and maintenance of the OS/VS1 operating system. Equivalent to college graduation and 4 yrs. exp. in systems analysis and/or systems programming, including 2 yrs. recent systems programming in OS/VS env. Candidates will be ranked for employment consideration by interview which may be conducted by telephone.

CITY OF SAN DIEGO

Personnel
202 C St.
San Diego, CA 92101
(714) 236-5560

Equal Opportunity Employer

PROGRAMMERS

Become part of a dynammic, growth-oriented company in the manufactured housing industry. Headquartered in the prime outdoor activity area of Central Wisconsin, Wick Building Systems, Inc., with 14 manufacturing facilities, is the nation's sixth largest manufacturer of mobile homes and the sixth largest manufacturer of panalized homes.

To accommodate our dramatic growth record, our data processing department has need for experienced programmers with a minimum of one year programming experience to work in an IBM 370 environment with teleprocessing. We offer excellant salary and benefits as well as a participative management environment which allows for professional and personal growth.

For more information, send resume with salary history to: Programming Manager, Wick Building Systems, Inc., P.O. Box 790, Marshfield, WI 54449. All resumes submittad will be handled on a completaly confidential basis.

An Equal Opportunity Employer M/F

WICK building systems inc.

DATA PROCESSING PERSONNEL

EG&G Idaho, Inc.,
the prime operating contractor
to the Department of Energy at
the Idaho National Engineering Laboratory,
has immediate opportunities for:

Computer Programmers

Candidates should have a college degree or equivalent, and a minimum of 1 year experience in the development and implementation of business and management information systems along with proven capability in ANS COBOL. Experience with MARK IV and/or DBMS and knowledge of JCL for OS/MVT is desirable.

Idaho Falls is a medium-sized community located close to top-flight winter sports areas (Sun Valley, Jackson Hole, Grand Targhee) and unexcelled summer recreation areas (Yellowstone, The Salmon and Snake Rivers, The Grand Tetons).

If intersted and qualified, please submit resume including salary history and requirements, in confidence, to:

TECHNICAL EMPLOYMENT-C
EG&G Idaho, Inc.
Box 1625, Idaho Falls, Idaho 83401
U.S. Citizenship Required
We are an equal opportunity employer M/F/H

EG&G

Programmer/ Systems Analysts

Our Pride in '77... Your Challenge in '78

At Decimus Corporation, we're proud of who we are and what we do But most of all, we're proud of our people Because good people are what have made us what we are—foremost leaders in Data Processing services for the Financial Industry And with this position of leadership has come growth DYNAMIC growth In order to keep pace, we're looking for the kind of people who can recognize the challenge and opportunity we have to offer and who can look to themselves for the kind of pride our people have established

Positions are available at various experience levels in

- **Communication Network Design**
- **Interactive Systems Development**
- **Systems Simulation • Distributed Processing**
- **EDP Audit • Check Processing (MICR)**
- **Teller Inquiry Control • Credit Card Processing Systems**
- **Deposit & Loan Systems • Database Systems.**

A State-of-the-Art working environment includes 370/155, 168, 195, SYS 3 (Mod 15), SYS 32, etc, and various minicomputers (General Automation, DataPoint, Four Phase, etc), and operates under OS, MVS, DDS, IMS, CMS-VM Software is primarily CDBDL, but includes Assembler RPG II, and PL-1

Decimus offers excellent compensation and an outstanding benefits package, including a dental plan and reduced loan interest rates Send your resume, including salary history/requirement, in confidence to D B Michaels, Decimus Corporation, Suite 320, 1700 Montgomery Street, San Francisco, CA 94133 We are an Equal Dpportunity Employer taking Affirmative Action M/F/H

Decimus corporation

A BANKAMERICA COMPANY

HOUSTON, TEXAS NEEDS YOU!

ALL SKILLS
ALL INDUSTRIES

The DPCenter
Data Processing Careers
4615 SW Freeway, Suite 900E
Houston, Texas 77027 • (713) 960-9108
Personnel Consultants

WHY EDP SEARCH?

Your file will be placed in our computer aided search system. When a position comes up in the area and discipline you desire it will automatically respond.

We have greater than 400 positions open across the U.S. Positions' are available in most every major city! 120 associates coast to coast! Contact:

EDP Search
2401 NW 39th, Suite 200
Oklahoma City, OK 73112
(405) 525-8833

SOFTWARE SALES

We're looking for highly motivated systems software salesmen with experience selling to the IBM DOS and DDS/VS marketplace. If you want to increase your income potential with a broad and diversified product line; call Bert Perstoe at (203) 792-5100. Universal Software, Inc. Brookfield Office Park, Brookfield, CT 06804.

GROUP MANAGER

CORPORATE M.I.S.
$25-30,000

Directly responsible for specific group of user divisions. Supervise up to 12 Programmers and Analysts. Staffing and Budget duties.

IBM 370 DS/VSI experience as a Project Leader or Senior Analyst. M.S. a definite advantage.

For immediate consideration, please call Ted Chaloner at (617) 426-4180. If submitting resume please include salary requirements. Client company assumes all fees.

ROGERS & SANDS
Professional Placement
100 Federal Street
Boston, Mass. 02110

FACULTY POSITION MANAGEMENT SYSTEMS

College of Business
Idaho State University

Assistant professor position, beginning August, 1978. Applicants should have an interest in teaching in several of the following areas within the computer science-info systems curriculum: MIS, Data Communication and Real-Time Systems, Systems Programming, Data Base, Simulation and Programming (Assembler, FORTRAN, COBOL). Opportunity to provide leadership in and give direction to our computer science-info systems area.

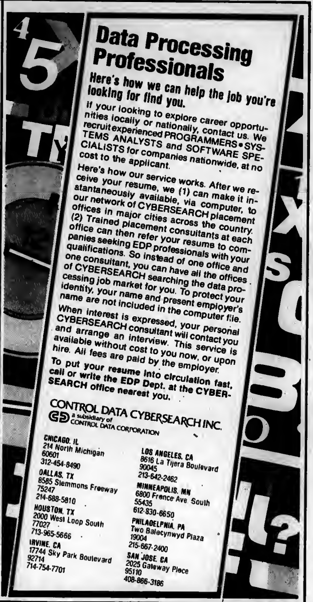
The College of Business offers an AACSB accredited BBA program and also the MBA degree. The atmosphere is congenial, yet professional. Recreation activities in Southeastern Idaho are boundless on a year-round basis.

A Ph.D. (or near completion) in MIS, computer science, ~~or a~~ related field is required. Industry and teaching experience is helpful.

Candidates should evidence an interest in research and publication activity as well as quality classroom performance.

Send resume to:

Dean James M. Kelly
College of Business
Idaho State University
Pocatello, Idaho 83209
(208) 236-2135



Data Processing Professionals

Here's how we can help the job you're looking for find you.

If your looking to explore career opportunities locally or nationally, contact us. We recruit experienced PROGRAMMERS • SYSTEMS ANALYSTS and SOFTWARE SPECIALISTS for companies nationwide, at no cost to the applicant.

Here's how our service works. After we receive your resume, we (1) can make it instantaneously available, via computer, to our network of CYBERSEARCH placement offices in major cities across the country. (2) Trained placement consultants at each office can then refer your resume to companies seeking EDP professionals with your qualifications. So instead of one office and one consultant, you can have all the offices of CYBERSEARCH searching the data processing job market for you. To protect your identity, your name and present employer's name are not included in the computer file.

When interest is expressed, your personal CYBERSEARCH consultant will contact you and arrange an interview. This service is available without cost to you now, or upon hire. All fees are paid by the employer.

To put your resume into circulation fast, call or write the EDP Dept. at the CYBERSEARCH office nearest you.

CONTROL DATA CYBERSEARCH INC.
a subsidiary of CONTROL DATA CORPORATION

CHICAGO, IL
214 North Michigan
60601
312-454-8490

DALLAS, TX
8585 Stemmons Freeway
75247
214-688-5810

HOUSTON, TX
2000 West Loop South
77027
713-965-5666

IRVINE, CA
17744 Sky Park Boulevard
92714
714-754-7701

LOS ANGELES, CA
8616 La Tijera Boulevard
90045
213-642-2462

MINNEAPOLIS, MN
6800 France Ave. South
55435
612-830-6650

PHILADELPHIA, PA
Two Balacynwyd Plaza
19004
215-667-2400

SAN JOSE, CA
2025 Gateway Place
95110
408-866-3186

Computer Professionals . . .
these numbers may add up to be
the most important you'll ever use.

(203) 549 4240

Find out why Call collect, person-to-person Ask for Steve Weber. But you must have at least one year work experience Oh, yes Here's the phone number (in case you missed it) . . . (203) 549-4240

National Computer Associates

DALLAS
DataPro Personnel Consultants
4255 L B J Freeway
Suite 152
Dallas, Texas 75234

DETROIT
Electronic Systems Personnel
Prudential Town Center
3000 Town Center Suite 2580
Southfield, Michigan 48075

FLORIDA
Data Sciences Personnel, Inc
Suite 205, 15490 N W 7th Ave
Miami, Florida 33169

HARTFORD
Compass, Inc
900 Asylum Avenue
Hartford, Connecticut 06105

LOS ANGELES
Constellation Enterprises
Suite 900, 3250 Wilshire Blvd
Los Angeles California 90010

MINNEAPOLIS/ST PAUL
Electronic Systems Personnel
801 Nicollet Mall Suite 1715
Minneapolis Minnesota 55402

NEW JERSEY
Systems Search II
75 South Orange Avenue
South Orange N J 07079

NEW YORK
Botel Associates, Inc
405 Lexington Avenue
New York, New York 10017

NORTH CAROLINA
TaskForce, Inc
1046 E Wendover Ave
P O Box 8888
Greensboro, N Carolina 27405

PHILADELPHIA
Systems Personnel
207 Fox Lane
Wallingford, Pa 19086

PITTSBURGH
Electronic Systems Personnel
106 Lawyers Building
428 Forbes Avenue
Pittsburgh, Pennsylvania 15219

SAN FRANCISCO
The Computer Resources Group Agency, Inc
303 Sacramento Street
San Francisco, California 94111

SYRACUSE
CFA Associates Personnel, Inc (Agency)
2530 James Street
Syracuse, New York 13206

WASHINGTON, D.C.
ESP Systems Corporation
Suite 210
1211 Connecticut Avenue N W
Washington, D C 20036

THIS AD REALLY COST A BUNDLE

BUT—WE'RE NOT LOOKING FOR SYMPATHY

JUST YOUR RESPONSE !

(Bet You Never Heard An Ad Put So Bluntly Before!)

WHY DID WE DO IT?

Simple — We have a variety of interesting positions for good, competent programmers and systems analysts. Normally, we fill most of our openings with personal referrals, but this year we are expanding into several new major market areas, and we can, therefore, offer employment opportunities to a wider population.

If you're thinking about a new position at all, take a minute and read the following few paragraphs about our company. Then, for more details, call our Toll Free Number and we'll be happy to fill you in.

WE OFFER A COMPENSATION PLAN WHICH IS SURE TO PROVIDE YOU WITH COMFORTABLE SECURITY

Excellent Salaries ... Per Diem Allowance ... Paid Vacations and Holidays ... Company-paid major medical insurance ... Life Insurance for you and your family.

ALLEN SERVICES CORPORATION IS BUILT ON FOUR BASIC PRINCIPLES

- Good old-fashioned honesty and integrity is the foundation of our company. We believe that in the world today these qualities are more important than ever before.
- Solid level-headed management. ASC's financial base has grown continuously since our beginning in 1972. Financially we are rather conservative.

  But we hold that in the long run, good down-to-earth business decisions are better than a lot of wheeling and dealing.
- Service — To both our clients AND employees. We try to make sure that the right person is doing the right job. This keeps programmers and analysts challenged and enthusiastic; and our clients satisfied.
- Flexibility — We are in an exciting and dynamic business that requires constant evaluation. We TRY to satisfy everybody. That's a tough order to fill, and we're not perfect. But we do whatever it takes (go the extra mile so to speak) even if it means that Mr. Allen and the Board of Directors have to get personally involved.

Call our TOLL FREE NUMBER, Monday thru Saturday and ask about our numerous D.P. job openings. 1-800-543-7583.

ALLEN SERVICES CORPORATION
DAYTON AIRPORT OFFICE
212 West National Road, Vandalia, Ohio 45377
In Ohio Call (Collect) (513) 890-1200
An Equal Opportunity Employer M/F

COMPUTER SYSTEMS ANALYSTS

The Andersons is a dynamic, Midwest company with sales in excess of $600 million, a history of steady growth in the agribusiness field and a unique philosophy and concern for its responsibilities to customers, community and employees.

Our continued growth and success has created an immediate opportunity in our data processing unit. You will be responsible for the analysis of information systems, evaluating computer hardware and software and directing technical efforts required to accomplish specific data processing objectives. A Bachelors Degree, and 3-5 years experience as a Programmer Analyst/Systems Analyst is highly desirable. Experience in designing, implementing, and installing new computer information systems is essential.

The Andersons, located in Maumee, Ohio, a suburb of Toledo, offers an excellent compensation program, a comprehensive company-paid benefits program that includes a liberal profit sharing plan, plus growth potential. For immediate action, please direct your resume and salary requirements, in confidence, to:

The Andersons

Mr. William A Beier
Employment and Benefits Manager
P.O. Box 119
Maumee, Ohio 43537
(419) 893-5050

PROGRAMMER

PDP-11 **REAL-TIME**

1+ year's experience with RSX-11M at systems level.
3+ year's experience with MACRO-11 and FORTRAN.

Responsibilities include executive modifications and maintenance, device driver, writing, real time and database applications. Ability to work closely with hardware engineers.

Salary commensurate with ability and experience. Excellent fringe benefits package. Pleasant location in Philadelphia suburb.

Send resume in confidence to:
BRIDGEPORT TEXTRON
200 Precision Rd., Horsham, PA 19044
An equal opportunity employer

Positions Available Nationwide
Call Toll Free
800-426-0342
Assured Confidentiality
and Employer Retained

Manager-Data Base Design 30-35K
5 years experience in 370 OS/MVT/VS with previous supervisory experience in IMS or equivalent.

System Programmers 22-25K
370 OS/CICS and H6000 experience.

Programmers 18-22K
Experience in COBOL and BAL. Openings on both Coasts and the Midwest.

Project Leaders 23-26K
Data Base/Data Comm. experience.

Prog./Analysts 18-23K
Need several with EEO/ERISA experience.

PARKER PAGE ASSOC.
P.O. Box 12308
Seattle, WA 98111
Offices in Wash. D.C.,
Chicago, Atlanta, Portland, Or.

Choose from over 100 careers!

A large securities firm is expanding its EDP staff creating immediate openings for PROGRAMMERS and PROGRAMMER/ANALYSTS.

You'll need at least one year's experience on large IBM systems operating OS, COBOL, IMS Data Base and OL/1. If you have a degree and knowledge of financial/insurance applications . . so much the better. Initial salaries range from $12-16,000.

This unusual career opportunity is located in one of the Midwest's most beautiful cities.

Join a company that offers advanced training and incentives, topped off with excellent benefits, and more!

For more information send resume, in professional confidence, including salary and relocation requirements to: Jeff Holmes

dorsey love
& associates inc.
PO Box 4486 G.S.
Springfield, MO 65804
417/883-1212

FIELD SERVICE OPPORTUNITIES

ECRM, Inc., a manufacturer of sophisticated computer equipment for the graphic arts industry, presently has several opportunities available for individuals with a background in field service.

FIELD SERVICE ENGINEER - VERMONT

Work and play in the heart of ski country. You will maintain our computer systems on-sight at one of Vermont's leading daily newspapers. Prefer 2 - 5 years experience with small computers and/or peripherals. Knowledge of PDP-11 and Pertec 3000 series disc drives desirable.

MARKETING TECHNICAL SUPPORT

Excellent opportunity at our corporate headquarters at Bedford, Mass. Will perform inhouse client demonstrations on our equipment, provide technical assistance to our marketing staff, coordinate trade shows, and follow through on RPO processing. Prefer familiarity with digital and analog circuitry and 2 - 5 years background in field service and/or technical support.

FIELD SERVICE -THE NETHERLANDS

The individual selected for this position will be located in the Netherlands maintaining our Autokon Process Reproduction System for 6 - 12 months and then return to the States. Requires experience maintaining small computers and/or peripherals plus a strong analog background. Experience in the newspaper industry and knowledge of optics helpful.

Other field service opportunities are available in the following cities: Oklahoma City, Washington, D.C., Dallas, Atlanta, Los Angeles.

ECRM is a forward moving progressive company offering an excellent opportunity for growth. If you would like to be part of our team, please call Cynthia Carney at (617) 275-1760 or forward your resume to:

ECRM, INC.
205 Burlington Rd. Bedford, MA 01730
Equal Opportunity Employer

ECRM

EDP Professionals --

Make your move!

Make your move into NBD's atmosphere of data processing professionalism and sophisticated hardware.

TP ANALYST - Utilize your 2-3 years of experience gained in a medium/large scale teleprocessing environment. You should be familiar with IBM 3705/3704 communications controller, 3270 bisynchronous protocol, and the IBM DS/MVS System 360 or 370. Ideally, your background also includes vendor liaison.

JCL SPECIALIST - You have 3+ years of analytical/problem-solving experience. JCL/IBM utility program background a must. You'll be working in an IBM 370 environment under OS/MVS - familiarity would be a plus.

NBD offers an attractive compensation-benefits package, a stimulating work atmosphere, and opportunities for professional advancement. Send your resume and salary requirements in complete confidence to:

Professional Employment Manager

NATIONAL BANK OF DETROIT

P.O. Box 116A-C
Detroit, Michigan 48232
An Equal Opportunity Employer M/F
We Employ the Handicapped

University of Petroleum and Minerals

Dhahran, Saudi Arabia

The University is seeking experienced:

- Systems Programmers: IBM 370 equipment; with 3-5 years experience in MVS system generation and maintenance; TSO; Performance Measuring and Monitoring.
- Scientific Analysts: with good working knowledge of FORTRAN: and a background in one or more of the following: Statistical Packages; Online Graphics; CAI/CMI; TSO; Documentation.
- Analysts/Programmers: with 3-5 years experience in business systems preferably University Business Systems; and a strong COBOL background in IBM OS/VS environment.
- Data Processing Staff Trainer: with 3-5 years experience in planning professional DP training programs; experience in instructing DP course in OS/VS environment.

Minimum regular contract for two years, renewable. Excellent salaries and allowances, free air-conditioned housing, free air transportation to and from Dhahran each two-year tour. Attractive educational assistance grants for school-age dependent children. Local transportation allowance in cash each month. Paid vacation each year.

Apply with complete resume on academic and professional background, list of references, and with copies of degrees, including personal data such as family status (wife's maiden name, names of children, age and sex) home and office addresses, telephone numbers to:

Director-Research Institute

University of Petroleum and Minerals

P.O. Box 986
Pasadena, Calif. 91102

PROGRAMMED FOR GROWTH

. . . And we keep growing. We've doubled our size in the last 4 years with current sales of over $50 million. This growth has resulted in the need for creative, results-oriented Data Processing professionals. As a vital member of our DP team, you'll be involved in such current applications as accounting, order entry, forecasting, inventory, bill of material and requirements planning as well as implementing additional manufacturing applications in one of these challenging career opportunities.

DATA PROCESSING MANAGER

Manage Data Processing function including equipment selection, systems analysis, programming and operations with an emphasis on developing improved techniques and methods. To qualify, you must possess the ability to manage and develop subordinates coupled with previous programming/systems design experience and at least 2-3 years management. You must be user oriented. Degree preferred.

SYSTEMS ANALYSTS

Ideal candidates should be senior programmers or analysts, preferably with manufacturing background including MRP and BOMP. Proven user contact and ability to meet target dates required.

PROGRAMMERS

1-2 years programming experience needed to qualify for these positions, preferably in a manufacturing environment.

In return for your abilities and experience, we offer an excellent salary, outstanding benefits and an atmosphere of professional growth and appreciation. Please send your confidential resume with salary history and requirements to: MS. REGINA SAMPERS

LOZIER CORPORATION

P.O. Box 188, Omaha, NE. 68101
An Equal Opportunity Employer M/F

SYSTEMS PROGRAMMERS

Experience in systems generation and maintenance particularly using VS1 will be helpful in securing this ground floor software position in the beautiful Pacific Northwest.

CICS/VTAM/ADABAS/WYLBUR experience also useful. Computer due for installation in October. Salary commensurate with proficiency.

Send resume and salary requirements to:

Ken Ashcreft
Supreme Court of the
State of Washington
Office of the Administrator
Temple of Justice
Olympia, Washington 98504
Phone (206) 753-3365

CLEMSON UNIVERSITY

Division of Administrative Programming Services is seeking a Manager of Systems Development for Student, Alumni, Library, and Development Information systems. This person will serve as manager of eight to ten analysts and programmers and be responsible for the design, programming, and implementation of application systems. Also, this person will serve as the primary customer interface for the areas served. Experience as a manager or project leader as well as experience with COBOL, on-line and database systems on a large scale computer is required. The University offers excellent career and learning opportunities in a state-of-the-art environment. Salary range is $18,012 to $25,599.

Send resume not later than January 31, 1978 to:

Clemson University
Administrative Programming Services
Revenel Center
Clemson, S.C. 29631
An EOE/AA

FLORIDA

IDEAL
ENVIRONMENT
WORK & PLAY
$1500 to $25,000

Programmers through Senior Technical Analysts. Degree required. STATS and On-Line Time Share. Honeywell 6000, CDC. FORTRAN, COBOL.

* * * * *

$2000 to $35000

DATA BASE MGT exp. Any 370-1108-Honeywell 6000 or PDP 11. COMPILER TRANS. DB-GENS-COMM GENS

Submit resume and salary history for immediate consideration on these career opportunity positions.

FRANK LEONARD
PERSONNEL
1211 No. Westshore Blvd.
Suite 100
Tampa, FL 33607
(813) 872-1853

PROGRAMMER ANALYST

to work for rapidly expanding wood products manufacturer in Sandpoint, Idaho. One to three years programming experience with mini-computers in a time-shared environment is desirable. College degree in computer science, mathematics, or business preferred. Starting salary to $16,000 commensurate with experience and education. Company offers excellent benefit package in a beautiful country setting. Submit resume and salary history in confidence to L.D. McFerland Company; Box 670; Sandpoint, Idaho 83864

An Equal Opportunity Employer

EDP SPECIALISTS

NATIONWIDE

Real Time Prog	**To 28K**
Systems Prog	**To 32K**
Systems Anlayst	**To 24K**
Field Electr Engr	**To 25K**

Fees Assumed by Client Co.'s

ATLAS AGENCY

412 W. 6th St., LA, CA 90014
(213) 627-9611

ANALYST/ PROGRAMMER

We seek an Analyst/Programmer to work on a new development project which will use P1/1, IMS/VS, and CICS/VS. Will be involved with the design, development, and implementation of this administrative system. Must be able to translate user requirements into a structured system which is clearly documented. We will train in IMS and CICS if you have PL/1, or PL/1 and IMS if you have CICS. 2 years experience desired with IBM 360/370, OS/VS or OS/MVT, PL/1 and OS/JCL. Plus factors; CMS, VSAM. Excellent benefit package included. Send resume to:

JOAN DOIG

PERSONNEL SERVICES

Princeton University

PRINCETON
NEW JERSEY 08540
An Equal Opportunity/
Affirmative Action Employer M/F

DECISION DATA IS ON THE MOVE!

Career Opportunities Available

ELECTRICAL ENGINEER (DESIGN): BSEE or MSEE with 5 to 8 years design experience in closed loop servo systems. Design of sweep circuits desired. Suburban Philadelphia.

ELECTRICAL ENGINEER (PROGRAMMER): BSEE or Degree in Computer Sciences with 3 to 5 years experience in logic design or design and programming of micro-processor based systems. Suburban Philadelphia.

COMMUNICATIONS PRODUCT MANAGER: Provide technical support to marketing personnel and client base, conduct product information seminars. Experience should include 3 to 5 years in data communications hardware, including experience in both hardware and protocol. Suburban Philadelphia.

OEM SALES MANAGER: Responsible for marketing our product line to OEM customers. Requires a minimum of 5 years successful experience in EDP hardware. Suburban Philadelphia.

SYSTEM/4 SALES MANAGER: Provide marketing and sales support of the new SYSTEM/4 computer. Minimum 3 to 5 years experience in the sale of small business computers desired. Experience in IBM System/3 or equivalent product required. Suburban Philadelphia.

TEST ENGINEER: Develop high volume production oriented test methods, procedures and software diagnostics for central processor and associated peripherals. Microprocessor experience required. Suburban Philadelphia.

SYSTEM SALES ENGINEERS: Provide marketing support of SYSTEM/4, our new state-of-the-art small business computer. Requires 2 years experience in technical assistance to sales of small business computers. Knowledge of RPG II essential. Positions in Baltimore, Chicago, Los Angeles, New York, Philadelphia, and Union, N.J.

TECHNICAL MARKETING AREA REPRESENTATIVE: Responsible for sale of our new serial printer family. Experience in the marketing of serial printers essential. Positions in Boston, Chicago and Los Angeles.

SALES REPRESENTATIVES: To market small computers, data entry equipment and peripherals. Positions in Montreal, Chicago, New York, Los Angeles, Philadelphia, and Union, N.J.

FIELD ENGINEERS: Responsible for the installation, maintenance, and repair of electro-mechanical equipment. Require 2 years college, military or technical school training and 1 to 2 years experience. Positions in most metropolitan areas.

Decision Data Computer Corporation is a leader in the small business computer industry and one of the largest independent suppliers of data communications and data entry products. Join a company on the move and enjoy our excellent compensation package.

For prompt scheduling of an interview call our Manager of Professional Employment at (800) 523-5357 or, mail your resume or detailed letter to the following address:

DECISION DATA COMPUTER CORPORATION

100 Witmer Road
Horsham, PA 19044
An Equal Opportunity Employer

SYSTEMS ANALYST PROGRAMMER

Our diversified company seeks e well motiveted individual to develop and coordinate new systams among division utilizing multi-computer sites and terminels. If you have a strong ecademic background and some working knowledge of date base end deta communications techniques (RPG II), this opportunity may be for you. Prefar on-line systams and manufacturing experience. Some opportunity to traval. For prompt confidential consideration, send your resuma and salery history to:

R.A. Borbidge

AMERICAN TRADING & PRODUCTION CORPORATION

P.O. Box 238
Baltimore, MD 21203

Equal Opportunity Employer M/F/H

FLORIDA SALES MANAGER DDP BASE TO $30

MANAGE staft ot 3 sales, 3 support in this booming markat. Excellent comp. plan & benefits. Your strong sales track racord in mainframe, mini or peripharals can quaiify. CHARGE now-shooting for QUICK on-board date. For info. and interviaw contact John Cummings of our firm

FRANK LEONARD Personnel

1211 No. Westshora Blvd.
Suite 100
Tampa, Fl. 33607
(813) 672-1653

DIRECTOR

Total responsibility for our growing suburban Chicago data processing installation. Will manage a staff of 50. We ara seeking an aggressiva application oriented problem solver experienced in DP managament. An IBM DDS/DS background is also highly desirable.

Excellent salary and benefits. Position offers planty of haadroom for a strong performer. Plaase send resuma with currant salary to:

CW Box 1369
797 Washington St.
Newton, MA 02160

C.C.P. Programmer Systems Analyst

We are an irragular route carrier, seaking an individual with System-3 programming expariance. Our major amphasis is on-line applications, so individual should have three to four yaars of RPG-II experiance with at least ona yaar of C.C.P. Knowledge of tha trucking industry halpful.

Salary commensurate with experience, education, and ability. Send resume and salary history in confidance to:

CW Box 1366
797 Washington St.
Nawton, MA 02160

Equal Opportunity Employer

New! 1978 Computer Salary Survey

Call for your FREE copy today!

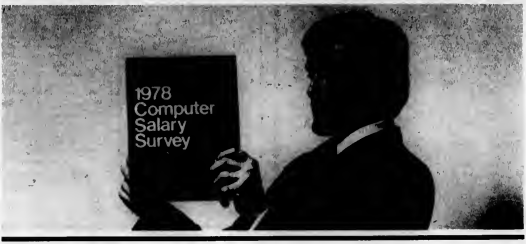
Are you making the kind of money you should be making? Inflation and record demand have pushed salaries in the computer field to all time highs. Source Edp's *1978 Computar Salary Survey and Career Planning Guida* lets you know whether you're keeping pace.

This comprehensive free report also gives you expert advica on a variety of important career topics such as:

- When you should consider a job change.
- What you need to do to break into management.
- How to make sure you're getting the proper exposure.
- Why timing is so crucial in your long range career development.
- How you can avoid stagnation.

And much more. The *1978 Computar Salary Survay* has been compiled by Source Edp, the largest recruiting firm devoted exclusively to the computer profession in North America. It's must reading if you're concerned about your career. But call now, it could be one of the most important career decisions you've ever made.

source edp



For your FREE 1978 Computer Salary Survey call the Source Edp office nearest you.

East:

Boston	617/482-7613
Hartford	203/522-6590
New York City	212/736-7445
Philadelphia	215/865-1717
Stamford, CT	203/329-8411
Union, NJ	201/687-8700
Washington, D.C.	703/790-5610
Wellesley, MA	617/237-3120

Midwest:

Chicago	312/782-0857
Cleveland	216/771-2070
Detroit	313/963-0510
Kanaaa City	618/474-3393
Minneapolis	812/544-3600
Northfield, IL	312/446-8395
Oak Brook, IL	312/986-0422
Rolling Meadows, IL	312/392-0244
Southfiald, MI	313/352-6520
St. Louis	314/882-3800
St. Paul	812/771-0544

South/Southwest:

Atlanta	404/325-6370
Dalles	214/387-1800
Denver	303/773-3700
Fort Worth	817/338-9300
Houston	713/626-8705
New Orleans	504/561-6000

West Coast:

Encino, CA	213/995-8866
Irvine, CA	714/833-1730
Los Angeles	213/386-5500
Oakland	415/444-5955
Palo Alto	415/328-7155
San Francisco	415/434-2410
Seattle	206/454-6400
Torrance, CA	213/540-7500

Canada:

Toronto	416/364-2919

If unabla to call, write:

Source Edp
Department C-1
721 Entarprise Driva
Oak Brook, Illinois 60521

When writing, please ba sure to use homa address and indicate position titla.

Royal

FOOD DISTRIBUTORS, INC.

COBOL 370/135 DOS/VS PROGRAMMER & SYSTEMS PROGRAMMER

- **New Jersey convenient location**
- **Quarter-billion, fast-growing company**
- **Food industry security end stability**

We're a large food distributor, a modern and dynamic company, keenly aware of the importance to our operations of a highly professional, up-to-the-minute EDP department. Work with power, without getting lost in a huge shop. You'll be visible with us, your progress will be ancouraged and fully noticed.

The programmer position calls for at least 2-3 years of experience, with some knowledge of distribution systams halpful.

The Systems/Programmer position calls for an indapth knowledge of on line applications with a knowledge of Taskmaster halpful.

Both positions offar an attractive compensation package. Please send resume with salary data in confidence to Diractor, Industrial Relations.

ROYAL FOOD DISTRIBUTORS, INC.
215 Blair Road, Woodbridge, N.J. 07095
An Equal Opportunity Employer M/F

H 6000 PROJECT LDR SYS/PROG. $28,000-$32,000

Exeter Associates

Executive Recruiters

Bruce A. Montville
P.O. Box 623,
Computer Park
Hampton, N.H. 03842
(603) 926-6712

INSURANCE SYSTEMS

Engineering consulting firm is requesting applicants for the position of programmer/analyst. Bachalors degraa plus 2 yrs. axpr. required; 5 yrs. expr. may ba substitutad. COBOL or FORTRAN a must. Data Base and Xerox CP-V axpr. preferred. Salary 13-17K. Send rasumes to:

Mr. R.D. Marshall
O'Brien & Gere Engr. Inc.
Box 4673
Syracuse, N.Y. 13221

Our expanding San Diego bank is developing an on-line Trust System, and has immediate opportunities for the following:

PROJECT MANAGER

Position requires 5 yrs, experiance in Trust and on-line systems design with knowledge of COBOL and previous supervisory responsibilities.

SR. ANALYST PROGRAMMERS

Requiras knowledge of COBOL with 4 yrs. experianca in Trust end on-lina programming with basic understanding of systems design concepts.

ANALYST PROGRAMMERS

Candidates must hava 3 years axparianca in COBOL financial programming.

Ideal candidates for ebove positions will hava had exposura to Burroughs medium systems architecture. Competitiva salary and benefits. Please send resume with salary requiraments to:

SAN DIEGO TRUST & SAVINGS BANK
Attn: M. Wheeler
P.O. Box 1871, San Diego, Ca. 92112
Equal Opportunity Employer M/F

COMMUNICATIONS SOFTWARE DESIGN

PROJECT LEADERS DEVELOPERS

If you're seeking a challenging career in communications software, consider

NCR's Communication Systems Division

NCR's Communication Systams Division, specializing in the development end manulacturing of date communications products and systems, is currently expanding its COMMUNICATIONS SOFTWARE group.

Get in on the ground lloor ol advanced communications design and participate in NCR's entry to DISTRIBUTIVE NETWORK ARCHITECTURE consisting of a series of microprocessor-basad terminal systems and modes connected by communication lines.

We are looking for key individuals who have indapth software background with solid communications experience. Qualified applicants must provide definition, design, end implemantation leadership; and have experience in any ol the lollowing ereas:

- **Microprocessor software (assembly level)**
- **Operating systems design**
- **Communications links disciplines (SDLC, bisynch, ISO, etc.)**
- **VTAM, NCP (for interface to SNA network)**
- **Front end processor software**
- **Network node software**
- **Network definition language (system generator)**
- **Constructors for nodes, cluster controllers, and front ends (COBOL)**

All our positions are in our beautilul, sunny South Ceroline location, close to the seashores and mountains. Columbia offers a lifestyle with excellent recreational facilities for tennis, golf, lishing, boating and swimming. The area also ollers excellent housing opportunities, low taxes, and it is the homa of the University of South Carolina and other line educational institutions.

If you are seeking a challenging career with a leader in the industry, need a new lilestyle and have the above expariance, we'd like to speak with you.

A degree in Engineering, Math or Computer Science is requirad. For consideration, please send your resuma and salary requirements in complete confidence to

NCR

Ken Uhlig, Dept. CS
Industrial Relations
Engineering & Manufacturing-Columbia
NCR Corporation
3325 Platt Springs Road
West Columbia, S.C. 29169

An Equal Opportunity Employar

---

pmi San Francisco

Informatics may have an opening for you on its permanent staff in San Frencisco. Other openings axist in Portland, Oregon. Your first assignment will be es a member of a professional davalopment taam implementing e lerga online datebase application under IMS/VS. Wa will be using structured programming techniquas and terminal-orientad programming support.

Salery range for these positions is to $27K, with e comprehansive company-providad benelit package, including a tex sheltared savings program. We require a minimum of three years' programming experience with 6 months of IMS. Qualilied candidates plaase submit lattar or rasume in conlidence to: Informatics PMI, 255 California Street, San Francisco, CA 94111, Attn: B. Cahn. An Equal Opportunity Employar, M/F.

informatics inc

Member SIA Softwara Industry Association

OPPORTUNITY

FOR:
(1) Project Manager
(2) Systems Analysts
(2) Programmars

EXPERIENCE:
Manufacturine/
Distributing/Accountine
COBOL/FORTRAN/
BASIC/RPG II
Interactive and/
or Data Base

BENEFITS:
Extraordinary
Growth Potential
Liberal Benefit Package
Equity Stock Option

Send your resuma
in confidence to
Staffing Manager
Softwara Group
CMC ASSOCIATES INC.
755 Boylston St.
Boston, MA 0211e

EDP OPPORTUNITIES

RAMIS Interective financial mktg & training system $30-37K
Sr. SYSTEMS Analyst-CICS DOS or OS degree $28K
APPLICATIONS Anal-CICS/TASK MASTER $24K
CICS New Design-DOS/OS PL-1 ADR library $26K
PROJ LDR-financiel systams-ROI $26K
Sr. Programmar Anal-370/158 OS/VS IMS BAL/COBOL $26K
MBA Quantetiva discipline-Fortran/BASIC $25-30K
SOFTWARE SUPPORT-OS/VS 1 TCAM $26K
PDP/1105-Basic/fortran/ALP $23K
FINANCL ANAL/Syst Anal-MBA + BASIC/Fortran $30-35K
FIXED INCOME/Forecasting investment banking. Fortren/Basic $27-30K+

Bill Borrelli
(212) 349-3610
William Harris Assoc
150 Broadway egency NY 10038

SYSTEMS PROGRAMMING DATA COMMUNICATIONS

The University of Delaware is seeking qualified candidates for a senior position in its Data Communications/Systems Software group. The person chosen will have responsibility for modification and development of innovative software on our large scale B7700 and DEC-10 computers. Candidates should be self-motivated and have a bachelor's/master's degree in computer science and/or engineering with 3-4 years effective experience in successful projects involving operating systems, language processors, or data communicstions programming on large scale computars. This position represents an exciting opportunity to grow in a multihost network consisting of HP2000, DEC 11/70, B7700, DEC-10, and CYBER173 computers in a modern University Computing Center. Send resume and salary requirements to:

Robert W. Rahe, Manager
Data Communications/
Systems Software
Computing Center
University of Delaware
Newark, DE 19711
An Equal Opportunity/
Affirmative Action Employer

PROGRAMMERS

PARS BAL COBOL

Continued expansion of our Data Systems Management Division has created immediate openings for individuals possessing at least 2 years experience utilizing BAL or COBOL. Experienced PARS/ACP programmers are encouraged to apply. DB/DC analysis is a plus. Exceliant growth opportunity and leadership potential.

Interested candidates should submit a resume including salary history to:

Department "C"
CONTINENTAL AIRLINES
7300 World Way West
Los Angeles, CA 90009

Equal Opportunity Employer M/F

ITEL CORPORATION

Data Services Group, is looking for a...

Communications Technician

- with solid field engineering-type experience in working with low-speed modems and multiplexors,
- to work with Itel Marketing Personnel and clients in coordinating all phases of new account installations,
- to provide technical support for existing accounts — from coordination and check-out of current systems through trouble-shooting and diagnosis of operational problems,
- to work in a multi-vendor environment.

If you're the Communications Technician we're looking for, send your resume in strict confidence to:

ITEL CORPORATION
Data Services Group
Personnel Administrator
3 Corporate Park Drive
White Plains, New York 10604

Itel Corporation is an equal opportunity/affirmativa action employer—M/F/H.

PROGRAMMER ANALYST

A growing Dallas-Ft. Worth electronics company, who is a recognized world laader in tha manufacture of telephone support aquipment, has an outstanding opportunity available for an expariencad Programmer Analyst.

The successful candidate must have 2-3 yaars proficiant experianca in COBOL, RPG, preferably ALC axperienca in an IBM 370/DOS/VS anvironment. Experienca with TOTAL data base and Environ-1 on-line systam will be considered a plus. If qualified you will ba acting in tha support of operations systems support, through-put improvement and some applications systems development in a business environment.

We offar an excellent income, comprahensive benefits progrem and opportunity for parsonel growth. If your qualifications include the above send your rasuma including salary in strictast confidence to:

CW Box 138B
797 Washington St.
Nawton, MA 021B0
an equal opportunity employer m/f

Customer Engineers and Area Specialists

Intel's fast growing Memory Systems Division, the leading independent supplier of OEM and end-user systems, has immediate openings in the Midwest.

We have several levels of opportunities for individuals with computer service background, preferably with IBM 370 equipment. Experience servicing memories is highly desirable.

Please call or send your resume to Intel Memory Systems, Attn: John Clark, 9501 West Devon, Rosemont, Illinois 60018 (312) 692-6410. An equal opportunity employer m/f.

intel

Memory Systems

MEDICAL INFORMATION SYSTEM DEVELOPMENT
PROGRAMMER/ANALYST

A Research Institute at the Indiana University Medical Center (Indianapolis) is seeking a bright and dedicated Programmer/Analyst to join in the development of a medical information system with national significance. Work involves networking, transaction processing and the development of an in-house data base system and an automated medical decision-making system. Applications extend to the clinical lab, the pharmacy, the medical record and the operation of the medicine clinics. Opportunity for strong interaction with users and responsibility for major application systems from design through implementation.

Position requires B.S. in Computer Science or equivalent technical degree and one to three years of employment as a Programmer/Analyst. Experience in the development of data management systems and/or PDP 11 RSTS, BASIC PLUS and/or RSX 11-M desirable. Experience with medical applications not needed.

Salary depends upon qualifications and experience. Please send resume (if possible, transcript) to Mrs. Joanne Lepper, 1001 West 10th St., Indianapolis, Indiana 46202.

An equal opportunity employer M/F

PROGRAMMER/ANALYST

A growing Dallas-Ft. Worth electronics company, who is a recognized world leader in the manufacture of telephone support equipment, has an outstanding opportunity available for an experienced Programmer Analyst.

The successful candidate must have 2-3 years proficient experience in COBOL, RPG, preferably ALC experience in an IBM 370/DOS/VS environment. Experience with TOTAL data base and Environ-I on-line system will be considered a plus. If qualified you will be acting in the support of operations systems through-put improvement and some applications systems development in a business environment.

We offer an excellent income, comprehensive benefits program and opportunity for personal growth. If your qualifications include the above send your resume including salary in strictest confidence to:

CW Box 1393
797 Washington St.
Newton, MA 02160

An equal opportunity employer M/F

COMPUTER PROGRAMMERS

Advance Your Career in Denver, Colorado with United Banka Service Company

A leading computer service subsidiary for the United Banks of Colorado seeks several computer programmer/analysts to work on deposit, loan, trust, CIF, EFT, applications on on-line systems; also, Check Processing and Automated Clearing House applications. We desire 2-4 years' banking experience in PL/1 and/or Assembler on large IBM 370 systems and/or 2-4 years' experience in NEAT/3 LEVEL 1, 2 NCR Century systems.

Your salary will be commensurate with your background and qualifications. We offer excellent fringe benefits, including relocation assistance, and the appealing lifestyle of Denver and the Rocky Mountain West. Please send your resume to:

**Susan B. Romero
PO Box 17006
Denver, Colorado 80217
OR CALL COLLECT
(303) 770-2400, Ext. 249**

An Equal Opportunity Employer M/F.

FEDERAL PROGRAM MANAGER
ADP LEASING AND RENTALS

The company seeks a managerial professional who will be responsible for planning, coordinating and directing marketing and administrative activities regarding federal government/military ADP procurement. The individual will appraise and recommend bidding on RFP's and other opportunities, conduct negotiations, and recommend longer range marketing strategies; bidding and negotiations will be done in conjunction with major hardware manufacturers. To qualify, the applicant will need 5+ yeras of industry experience managing the negotiation and administration of government contracts for computer hardware or services. A finance background is desirable; managerial experience and financial aptitude is necessary. Position offers executive compensation plan with bonus potential.

Send detailed resume, including salary history to Anne Halsted, U.S. Leasing Corporation, 633 Battery St., San Francisco, CA 94111. No agencies please. An affirmative action employer.

US LEASING CORPORATION
A US Leasing Company

Guess Who Has A Job For You ?

WALT DISNEY WORLD has immediate openings for a Scientific Programmer, a Senior Systems Programmer, and a Programmer/Analyst.

© 1975 WALT DISNEY PRODUCTIONS

Scientific Programmer

Walt Disney World's Scientific Programming Group is seeking a talented software professional to take an active role in the development of unique Real-Time Minicomputer Systems. Initial responsibility will be in the area of Energy Management Control Systems. Strong experience in systems development on minicomputers with emphasis on Data General NOVA or ECLIPSE is mandatory. Individual should be proficient in assembly language coding and Real-Time Multi-Tasking FORTRAN. A degree in mathematics, engineering or computer science is necessary.

Senior Systems Programmer

Candidates should have a minimum of 3 years experience in several of the following areas:

1. Univac series 90 VS/9 Operating System (or other virtual operating system) internals.
2. Telecommunications software systems.
3. Telecommunications network design.
4. Telecommunications hardware evaluation.
5. BAL
6. Minicomputers in distributed networks.
7. Performance monitoring.

Programmer/Analyst

1-5 years experience required in the design and programming of business applictions. This an opportunity to become involved in a wide range of business applications, including interactive programming in an on-line virtual memory enviornment.

Qualified applicants should submit a complete resume with salary requirements to:

**WALT DISNEY WORLD
Professional Staffing FN-9
Post Office Box 40
Lake Buena Vista, Florida 32830**

Walt Disney World.

AN EQUAL OPPORTUNITY EMPLOYER

SAN DIEGO SYSTEMS ANALYSTS

(to $1,793. mo.)

IT'S 70° IN SAN DIEGO

Picnic at the beach, swim in the Pacific, or ski in our mountains. If you were here, you could do these things today.

The city of San Diego has immediate opportunities for motivated and committed systems analysts working in a highly advanced environment. Tell us of your education and experience and you may qualify for an opening from Trainee to Sr. Systems Analyst. The City offers stable work with no possibility of forced transfer out of San Diego area.

Applicants should have the equivalent of a Bachelors Degree and experience in the analysis, design, and programming of business applications using ANS COBOL in an environment similar to an IBM 370-158, utilizing OS/VS1, IMS/VS, DB/DC.

**CITY OF SAN DIEGO
Personnel
202 C St.
San Diego, CA 92101
(714) 236-5753**

Equal Opportunity Employer

Burroughs Programmers & Business Systems Analysts

PROGRAMMER . . . Degree in DP or equivalent with 3 years' experience in coding and documenting business applications with Burroughs hardware. Knowledge of NDL, Forte II and MCPV required.

SYSTEMS ANALYST . . . Degree in DP or equivalent with minimum 5 years' experience in business programming and systems analysis using Burroughs hardware and software. Responsible for the analysis of company systems' problems and solutions. Required to make formal presentations and written reports for review purposes. Knowledge of NDL, Forte II, and MCPV required.

Please send resume and salary history, in confidence to:

WB *Wismer and Becker*

**Box 1168, Dept. CW-1
Sacramento, CA 95806**

Equal Opportunity Employer M/F

JOIN WANG's GROWTH IN 1978

WANG had a great year in 1977 and we expect an even better one in 1978 (We expect sales of $200 million). Our leadership in state-of-the-art has helped keep us in the forefront of the computer and word processing industries and this has been reflected in our growth - in sales, in staff, in opportunities. If you like a fast-paced, demanding, challenging atmosphere where your individual contributions will be recognized, you have found your place at WANG.

Systems Programmer

State-of-the-art data center is seeking a Systems Programmer to support our IBM 370/158 running under VS 2 (SVS). This position requires 1-3 years experience with OS or VS modifications or maintenance. Must be able to work with little or no supervision. Experience in any of the following areas is a plus: HASP, JES2, WYLBUR. Opportunity to get into MVS.

Programmer/Analysts

A business oriented individual with a minimum of 4 years experience in the design and development of commercial and/or government-oriented accounting (or financial) systems on OS/VS, interactive, CRT-based hardware. Experience in COBOL, RPG II, and Assembler languages is a plus.

Software Technical Writers

Experienced technical writers to participate in the documentation of a major new computer and word processing system. The successful candidates should have at least 1-3 years experience in systems software documentation or a related field. (Programmers with an interest in writing are invited to apply). Knowledge of high level programming language a must. Knowledge of an assembler level language a definite plus.

Software Systems Programmers/ Compiler Designers Research and Development

You will work in a progressive, productive professional atmosphere developing incremental interactive language compilers for BASIC, COBOL, RPG II, database, QUERY language, FORTRAN, PL/1 and W1PL (our implementation programming language). You will work with bright, interesting, competent people dedicated to high standards of excellence.

Excellent salaries and earning potential plus superior company benefits. Please send resume, including academic background and salary history and requirements to:

Stephen E. Pitt
Manager, Professional Recruiting
(or call our toll free number)
1-800-225-0654 (West Coast area)
1-800-225-0630 (East Coast area)
(when using toll free number, please specify account number 02179)

WANG LABORATORIES, INC.
One Industrial Avenue, Lowell, MA 01851
We are an equal opportunity/affirmative action employer.

ASSOCIATE DIRECTOR FOR TECHNICAL SERVICES

International research organization has immediate vacancy for experienced manager with responsibility for policy and administration of computer programming, word processing, and graphics services. The Technical Services Department has a staff of forty and hardware including a Burroughs B6700 and an integrated mini based word processing/typesetting system. A major area of emphasis will be expansion of services to the commercial market. Salary range 30-50K. Send resume to:

Personnel Services Division
International Fertility Research Program
Research Triangle Park, N.C. 27709

SYSTEMS ANALYST

We are a progressive marine corporation seeking an energetic individual as a Systems Analyst. Must have a minimum of 3 years experience in systems analysis, IBM System 3, 3741, and communications. Degree helpful but not necessary. Salary will commensurate with experience. Excellent fringe benefits including group insurance, savings plan, and retirement plan. Send complete resume with salary history to:

Bill Clingon
Gulf Mississippi Marine Corp.
225 Baronne St., Suite 600
New Orleans, Louisiana 70112
An Equal Opportunity Employer M/F

IMMEDIATE OPENING

IBM 370 specialist 3135 and/or 3145

Salary $32,000-Plus!

Other positions open for trained 370 CE

top pay and benefits.

Call Immediately

(312)843-0630

Circle Computer
920 Remington
Schaumburg, ILL 60195

FIELD SERVICE

SYSTEMS	370/360, H-200, XOS, Univac, CDC All Large & Medium CPU's
MINI's	PDP, NOVA, G.A., HP, etc. All Mini Systems
I/O	STC, TELEX, CDC, ITEL, CALCOMP, etc. All Peripheral Experience

MTTR
(312) 547-8622
MTTR ASSOCIATES
1107 Mannheim Road $12-30K
Westchester, Ill. 60153
Field Service Specialist
Nationwide Placement
Private Employment Agency
No Fees To Applicants

CUSTOMER ENGINEERS

We need experienced Customer Engineers in:

- Atlanta
- Boston
- Chicago
- Dallas
- Detroit
- Denver
- Houston
- Kansas City
- Miami/Tampa
- Minneapolis
- New York
- North/South Carolina
- Phoenix
- St. Louis
- Seattle
- Washington, D.C.

We're looking for mature, self-motivated individuals with software background and at least 5 years demonstrable experience in identifying, isolating, and repairing system malfunctions.

Our Customer Engineers have total responsibility for customer installation encompassing preventive and corrective maintenance procedures on all aspects of the entire system and associated peripherals, plus installation and testing of both upgraded and new software and hardware products.

TANDEM COMPUTERS is a young, growing company specializing in multi-processor systems which run non-stop in a wide variety of critical applications where continued operation & data integrity is of utmost importance.

If you are seeking a career opportunity and have the required background, send your resume & salary history to:

Mr. A. Lee Mitchell
Customer Engineering
TANDEM COMPUTERS INC.
19333 Vallco Parkway
Cupertino, CA 95014

TANDEM COMPUTERS
An equal opportunity employer

EDP Systems Professionals

We are an internationally prominent "Big 8" CPA firm seeking EDP systems professionals to join a national development group.

This group is responsible for the design and implementation of systems, audit and applications software used by the firm's professional staff to service a broad client base in areas such as manufacturing, hospitals, goverment and education.

OPERATING SYSTEMS SPECIALISTS

- Extensive hands-on experience with IBM operating systems such as DOS/VS, OS, VS1, SVS, MVS, VM/CMS.
- Hands-on working knowledge of the internals of IBM subsystems such as CICS, IMS, HASP, JES.

APPLICATIONS SYSTEMS SPECIALISTS

- ANS/COBOL - Solid background in COBOL environment with design and implementation experience.
- DATA BASE - Experience with the development of applications using data base management systems such as IMS, TOTAL, etc.
- CICS - Background in design and implementation of applications utilizing CICS.
- JCL - Solid experience writing JCL for OS/VS or DOS/VS systems.

INTERACTIVE APPLICATIONS SPECIALISTS

- Business planning/financial/accounting background.
- Ability to communicate with non-technical professional people.
- Programming experience, primarily FORTRAN.

These key positions are based in New York City and involve some travel. Compensation program is most attractive and includes full benefits. For consideration, reply in assured confidence with resume and current compensation to: CW Box 1383, 797 Washington St., Newton, Mass. 02160.

We are an equal opportunity employer, m/f

Director of Computer Center

DEC 1170 time-share system at private liberal arts college. Supervise development of both instructional and administrative applications. Minimum qualifications are Masters degree and experience in college computing applications; salary competitive. An equal opportunity employer. Send credentials by January 20 to Ronald Kapp, Provost, Alma College, Alma, MI 48801.

SYSTEM PLANNING & CONTROL ANALYST

Major energy producing co. located in metro N.Y. area. Degree with 2+ yrs of systems design and programming IBM 370/06 in COBOL. Administrative procedures and data processing standards. Excellent communication skills required. $26,000 FEE PAID.

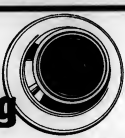
ROBERT HALF
PERSONNEL AGENCIES
622 Fifth Avenue
New York, N.Y. 10036
(212) 221-5500

Executive Director of Computing/Data Processing

The University of Wisconsin-Stevens Point is seeking an Executive Director of Computing/Data Processing Services. Reports to the Assistant Chancellor for University Services and is responsible for instructional computing, research computing, administrative data processing, administrative systems, and public service computing functions. Salary: $25,000. Qualifications: PhD preferred, Masters required, and successful managerial experience in computing/data processing or systems.

Apply by February 1, 1976 to Dr. David Coker, Assitent Chancellor for University Services, University of Wisconsin-Stevens Point, Stevens Point, Wis. 54461. Telephone: (715) 346-2641.
equal opportunity, affirmative action employer.

Start Something



We are an exceptionally well-capitalized new computer corporation in Nashua, New Hampshire. Our management team is comprised of experienced, successful computer industry entrepreneurs. Our computer system employs radically new architecture and several unique features that make its cost-effectiveness very attractive, and its scientific/business applications unusually wide-ranging.

We don't expect you to believe all that because we say so here. But if you're the kind of person we're looking for we expect you to give us the chance to prove it. Key positions exist for individuals with these qualifications:

Technical Writer (up to $24,000)
You will write software (and some hardware) documentation involving novel architecture on a new, state-of-the-art computer system. As our first Technical Writer, your potential for growth will be exceptional.

Q.C. Test Engineer (up to $24,000)
You will specify and design digital test equipment for subassembly and final test. Qualified candidates must know in-process inspection, reliability engineering, testing and Q.C. Strong managerial skills preferred.

FORTRAN Systems Programmer (up to $22,000)
As a key member of our compiler development team you will have complete responsibility for library routines and the FORTRAN run system.

Diagnostic Programmer (up to $24,000)
You must be familiar with computer architecture. You will be writing diagnostic on-line and off-line tests. A knowledge of both hardware and software is a decided plus.

Utility Programmers (up to $18,000 & $24,000)
You will be doing pioneering work in writing assembler and utility programs for a completely new computer architecture.

Programmers (up to $20,000)
We will be employing microprocessors in several new ways to create a background computer-control network. This pioneering effort offers a tremendous challenge for professional growth and insight into state-of-the-art computer design.

Engineering Assistants (Salary Open)
You will assist design engineers in the development and testing of major computer subsystems. At least four years' related experience is necessary.

Field Service Manager (up to $25,000)
This is a once-in-a-career opportunity to set up an entire Field Service network. You must be a highly skilled organizer, as well as technically competent. (We are interviewing now for hiring in March or April.)

This could be your once-in-a-career opportunity to get in on the beginning of something big. Start by calling our staffing consultant, Prescott Behn, at (617) 369-8505 or send your resume to him at 15 Lowell Road, Carlisle, Mass. 01741.

FUNCTIONAL AUTOMATION

An equal opportunity employer

CSC

PROGRAMMER/ANALYSTS

Immediate Opportunities

Computer Sciences Corporation, a recognized leader in software development, is looking for mid and senior level professionals to participate in and lead the development of large scale information systems and data bases. The systems will be operational on a H6000 WWMCCS computer with major portions of the development effort to be accomplished in a time-sharing environment.

A BS or MS in Math or Computer Science is desired but not mandatory. Applicants should have a minimum of 2 years experience in the design and development of information systems and data bases using COBOL/I-D-S. These are high visibility positions requiring extensive customer interface and the exercise of communications skills.

The project is conveniently located near Crystal City in Arlington, Virginia with ample free parking and easy access to METRO.

For prompt consideration, send resume and salary requirements to:

Dianne F. Reason

Systems Division
COMPUTER SCIENCES CORPORATION
6565 Arlington Blvd.
Falls Church, VA 22046
Major Offices and Facilities throughout the World
Equal Opportunity Employer M F

PROGRAMMER/ANALYST

Rapidly growing energy resource service company, headquartered in Denver, has immediate opening for intermediate level programmer/analyst. Requires 3 years experience with COBOL. Familiarity with IBM 370/145, DOS/VS installation helpful. Responsibilities will include applications programming, maintenance, and special projects. Advancement potential. Please send resume, including salary requirements to:

PERSONNEL MANAGER
P.O. Box 2612
Denver, Colorado 80201

Equal Opportunity Employer M/F

---

computer hardware and software candidates

RELAX

We have scores of openings in all parts of the U.S. Our fees are paid by hiring companies anxious to find qualified computer hardware and software candidates. Contact the nearest office for confidential service and let us do the foot work.

COMPUTER CAREERS INC.
Specialists-Data Processing 4720
Montgomary Lane # 503 Bethesda, MD. 20014
(301) 664-9225

EASTERN PERSONNEL, INC.
1002 First Union Bank Bldg.
P.O. Box 1052
Wilmington, N.C. 28401
(919) 792-2624

BRENTWOOD
PERSONNEL ASSOC..
Computer Division
1290 Route 46
Parsippany, N.J. 07054
(201) 335-6700

ANDERSON-TAYLOR
P.O. Box 21
Exton, PA. 19341
Philadelphia area
(215) 363-1600

members of
National Personnel Associates
Specializing in DP

UNIV. OF WISCONSIN SUPERIOR

Instructor or Assistant Professor to teach undergraduate business administration courses with emphasis on data processing languages and systems beginning with Fall, 1978 quarter. Position involves assignment and supervision of student activities using the PDP 11/70 system. Applicants should possess Master's degree in management information systems or business administration as minimal educational preparation. Application deadline is March 1, 1978. Send resume, references, and official copy of transcript for all coursework to Dean, College of Business and Economics, University of Wisconsin, Superior, WI 54880
An Equal Opportunity Employer

SYCOR

Sycor is on the move...

...and staffing up its dynamic marketing teams in Boston, Washington, Philadelphia, Los Angeles, San Francisco, Chicago, St. Louis, Dallas, Houston, Kansas City and 30 additional locations.

The company's growing line of technically advanced distributed data entry and processing equipment is meeting strong market acceptance across the country. Systems Engineering and Sales have been cited as an important contributor to this rapid rise. More technically sophisticated problem solvers are needed now. Here is your opportunity to join a distinguished leader in the computer industry.

Sales Representatives

Minimum of three years experience successfully selling terminals, peripherals, or small systems that demonstrates a proven track record of sales over quote coupled with a general knowledge of DP applications, including communications is required. Responsibilities will focus on the development of territorial sales for a complete line of computer products and the support of existing customers.

Systems Engineers

COBOL or Assembler programming experience essential, communications with bi-sync and on-line background helpful. Ideal candidate will have the above experience, a BS degree, and a background in either Micro-Mini systems or programmable terminals or systems support. Any exposure to data entry applications and marketing customer support would be an asset.

We offer competitive salary and a full-paid benefit package, including retirement. Send resume and salary history or call toll-free:

1 (800) 521-3497
In Michigan dial (313) 363-6129
Corporate Employment & Staffing

SYCOR, INC.

SYCOR, INC.
100 Phoenix Drive
Ann Arbor, Michigan 48104

An Equal Opportunity Employer M/F

"Sycor Puts Computer Power Where the Work is"

SYCOR

PROGRAMMER/ ANALYSTS

Our corporate management is committed to the long term development of computer supported systems. With their support we are developing effective people-oriented systems in a Data Base-Data Communication environment.

We are in the early phases of installing an integrated manufacturing control system in our eight divisions; we need growth-oriented PROGRAMMERS who will be ready to assume Project Leader roles in the near future.

COBOL proficiency and experience in a manufacturing environment a plus. Attractive salary with company paid benefit package, including relocation assistance and tuition reimbursement.

To reply in confidence please send a letter or resume or call

WEHR CORPORATION

Nancy Saeger
Wehr Corporation
10201 W. Lincoln Ave.
Milwaukee, WI 53227

CFO EXPERT

Life insurance company located in a pleasant suburb just northwest of Chicago is seeking a Senior Analyst/Programmer to spearhead conversion from '62 CFO to CFO+ and then assume project leader responsibilities for it and related administrative systems.

Qualified candidates will have a college degree and heavy insurance background with at least 3 years experience with CFO.

We offer a salary in the twenties and an excellent package of fringe benefits including dental insurance. Send your comprehensive resume to:

Box 437
Park Ridge, IL 60068

Computer Engineer

To join the faculty of Electrical Engineering Department at the University of Southwestern Louisiana. Experience in computer hardware design and its application to engineering problems. Ph.D. in Electrical Engineering or Computer Engineering desired with demonstrated research ability. Accomplishments should include publication and participation in professional organizations. He or she will teach and conduct research. Salary is open to negotiate. The University of Southwestern Louisiana is an Equal Opportunity Affirmative Action Employer and is in compliance with Title IX and Section 504 of the Rehabilitation Act. Mail resume by March 15, 1978 to: William A. Klos, USL, P.O. Box 4-3890, Lafayette, LA 70504.

California Opportunities for Data Processing Professionals

Our client, one of the nation's largest restaurant chains, is currently seeking highly motivated individuals to assume responsible positions as Programmers, Systems Analysts and Project Leaders in their rapidly growing EDP Department. New systems development is underway in the areas of Finance, Restaurant Operations, Marketing Analysis, Distribution and Point-of-Sale.

Qualified candidates will have a minimum of two years' business programming experience in COBOL on medium to large machines. Salaries range from $14 to $24K. Complete relocation expenses and excellent benefit package provided.

We are consultants to management. If you are interested in a dynamic, growing company with plenty of opportunity for individual growth and desire to live on the Southern Coast of California, please send your resume and salary history in confidence to Box **CW-1387, 797 Washington St., Newton, Mass. 02160.**

An Equal Opportunity Employer M/F

BASIC-FOUR SYSTEM PROGRAMMER

Northern New Jersey corporation seeks senior programmer for BASIC-FOUR Mini computer. 3 years programming and 1 year BASIC-FOUR system programming experience. Will manage and maintain programs, and supervise operators. Hours must be flexible. Salary 15-18K plus excellent company fringe benefits. Please send resume and salary requirements to:

CW Box 1390
797 Washington St.
Newton, Mass. 02160

MINI-SOFTWARE

San Francisco
Bay Area

Management & Staff positions exist in the development of software for network communications, operating systems design or generation of system level software to communications interfaces. This NYSE firm is expanding rapidly. Salaries to $26K+.

For these & other outstanding career opportunities, please call or write, in confidence, to:

OMICRON INC.

One Ecker St.
San Francisco, CA 94105
(415) 546-7200
525 University Ave.
Palo Alto, CA 94301
(415) 328-6150
Exclusively employer retained agency

DATA BASE CONSULTANT

Professional career opportunity with a high technology consulting firm based in St. Louis. Responsibilities will include technical assistance in applications data base design and tuning, client training, etc.

In addition to exciting challenges and a variety of responsibilities, you can expect an attractive compensation and benefits package.

Interested candidates may submit resume and salary history in confidence to:

CW Box 1369
797 Washington St.
Newton, Mass. 02160

DATA PROCESSING DIRECTOR

Responsible for development, implementation and management of comprehensive data processing system for rapidly growing school district. Extensive knowledge of state-of-the-art hardware; both instructional and administrative software required. Managerial experience and programming and systems design prerequisites.

Salary: $21,500-$24,750
Apply: Personnel Department
Paradise Valley Schools
3012 East Greenway Road
Phoenix, Arizona 85032

SYSTEMS PROGRAMMER

Large WNY mfg. co. needs OS/VSI SYSGEMS with min. 2 yrs. maint. exp. ASSEMBLER required. Will be important member of small team. Degree. $16,000 (Fee Paid).

ROBERT HALF PERSONNEL AGENCIES
1310 Liberty Bank Building
Buffalo, N.Y. 14202
716-842-0801

PROGRAMMING OPPORTUNITIES

ECRM, Inc., a manufacturer of sophisticated computer equipment for the graphic arts industry presently has the following excellent opportunities available for programmers:

SENIOR PROGRAMMER

Responsibilities include software development and support on our interactive graphics systems. Prefer 3 - 5 years assembly language experience on PDP-11. Knowledge of DOS, RSX-11 and type setting applications desirable, but not mandatory.

DIAGNOSTIC PROGRAMMER

Will maintain and improve existing diagnostics, as well as develop diagnostics for new hardware. Two years experience with assembly level language on PDP-11 preferred. Some knowledge of digital hardware helpful.

ECRM is a progressive, forward moving company offering an excellent opportunity for growth. If you would like to be part of our team please call Cynthia Carney for more information at 275-1760 or forward your resume to:

ECRM, INC.
205 Burlington Rd., Bedford, Mass. 01730
Equal Opportunity Employer M/F

ECRM

DISTRIBUTORS

Wordplex Corporation is a leader in the rapidly expanding word processing industry. We offer the broadest and most advanced range of products available—from a single station screen-based system to shared logic systems with as many as 32 word stations and massive storage.

In 1976, following a 3 year development program, the Wordplex products were first announced in Europe. Success has been outstanding with the result that Wordplex distributors now occupy prominent positions in all major European and Australian word processing markets.

We are now seeking organizations with experience in distributing computing systems in Canada and the following areas of the U.S.—

Alabama
Alaska
Albany & Buffalo, NY
Arizona
Arkansas
Hawaii
Idaho
Indianapolis, IN
Kentucky
Louisiana
Miami, Florida
Mississippi
Montana
Nevada
New Hampshire
New Mexico
North Carolina
North Dakota
Oregon
South Dakota
Tennessee
Utah
Vermont
West Virginia
Wyoming

Contact Geoff Groom
31829 W. La Tienda Dr., Westlake Village, CA 91361
(213) 889-4455

wordplex

PROGRAMMER ANALYST

Growing client base includes many excellent career opportunities in development, consulting and package installation. Individuals with well developed technical skills, solid analytical capabilities and a "big picture" orientation will be given the opportunity to play an important role in a variety of environments.

Current openings include:

NEW ENGLAND
ALC or COBOL 15-23K
LIFE or CASUALTY
MIDDLE ATLANTIC
ALC or COBOL, 18-22K
LIFE INSURANCE
MIDWEST
ALC or COBOL, 18-23K
LIFE INSURANCE
SOUTHEAST
ALC or COBOL, 17-28K
CREDIT, CASUALTY, PENSIONS, LIFE
SOUTHWEST
ALC, LIFE 18-28K
INSURANCE

Exceptional individuals at all levels are invited to explore these opportunities with Jack Edwards. Jack is an FLMI and deals exclusively with insurance clients.

Jack Edwards Associates
Suite 600
8150 Leesburg Pike
Vienna, Virginia 22180
(703) 821-0688
Insurance Personnel

USER SERVICES MANAGER

Responsible for supervision of a staff of 8 to 10 computer professionals in providing programming, consulting, education and support services for users of the Rand Computation Center.

Candidate is expected to have a strong background in and knowledge of the principal higher level programming languages and statistical packages and must be able to develop good working relationships with a large number of users. BA/BS required, preferably in Computer Science.

SYSTEMS PROGRAMMER

Position available for experienced IBM systems programmer with internal knowledge of MVT, SVS or MVS. Knowledge of utilities, job management and supervisor services required. Knowledge of VSPC and VSAM desirable. BA degree and good organizational and documentation skills required.

Send resume establishing qualifications, full employment, earning history and salary requirements to Kenneth R. Logan.

THE RAND CORPORATION
1700 Main St.
Santa Monica, CA 90406
An Affirmative Action Employer

SALES & MARKETING

Our client, a nationally known leader in software package RJE sales has commissioned us to find numerous sales, marketing and account executive personnel to fill expanded needs across the country. They seek experienced (Jr. or Sr.) personnel familiar with these products. Experience with manufacturing accounts a plus. All costs are paid by our employer. Company has excellent benefit package and incentive program. Here is a sample of current needs:

Sr. Marketing Consultant	$30-45K+
Lead Marketing Representative	$30-35K+
Sales Reps (SR.)	$24-30K+
Sales Reps (JR.)	$20-24K+

CALL TOLL FREE 24 HRS./DAY

1-800-821-2270 EXT. 605

(In. Mo. 1-800-892-7655)

Bill Denny, V.P.

Jim King and Associates

438 Gulf Life Tower/Jacksonville, Florida 32207
(904) 398 7371

PROGRAMMERS

We need several information systems professionals to help us develop a new generation of systems. The basic hardware/software configuration is IBM 370/138, DOS/VS, POWER, CICS, DL/I, VSAM, SPM II, Assembler and COBOL. Our management approach is people-oriented with a strong emphasis on planning for continued growth in a wide range of medical and financial applications. Successful candidates for these programming positions will perform a complete scope of program development activities including logic design, instruction coding, documentation, program testing and user education.

We will select individuals based on employment background, work experience and education. Minimum qualifications include an Associates degree and 2 years experience. Contact:

W.M. Jones

Harper-Grace Hospitals

Human Resources Department
3990 John R.
Detroit, MI 48201
(313) 494-8082

An Equal Opportunity Employer M/F

---

data processing.

PROGRAMMERS

Key Positions with Our Winning Computer Consulting Team in Springfield, IL., Indianapolis and Chicago.

If you're skilled in COBOL, ALC and/or PL-1 and have at least a 2 year success record of accomplishment with large scale IBM systems under IMS . . . we have the programming and system challenges to match your expertise. These positions require high productivity.

As a member of our professional staff, you'll be rewarded with an excellent salary and benefits. For details call Don Breitfelder collect, from 10AM to 5PM at (312) 786-0220.

INDECON, INC.
300 South Wacker Drive
Chicago, IL 60606
since 1966
An Equal Opportunity Employer M/F

CSC

Computer Engineering PROFESSIONALS

THE CHOICE CAREERS

See Them At The Applied Technology Division of Computer Sciences Corporation

The Computer Sciences Corporation team of over 9,000 professionals will testify to the truth of our challenging assignments, excellent income offers, and growth careers.

CSC Applied Technology Division provides a full range of information systems technology programs to govenrment agencies and private Industry and offers you every opportunity to develop your professional skills and to meet both personal and professional challenges on one of our support projects.

SELECT YOUR IDEAL LOCATION...

☐ **MOUNTAIN VIEW, CALIFORNIA**

Applications Engineers with Fortran programming experience to provide programming/analysis for helicopter and aircraft simulation for the NASA AMES program.

☐ **NASA KENNEDY SPACE CENTER, FLORIDA**

Programmer/Analysts with H6000 COBOL, Fortran, GMAP or GCOS experience.

☐ **SAN DIEGO, CALIFORNIA**

Programmer/Analysts with Fortran or systems experience on NOVA or HP minicomputers to work at our Naval Ocean Systems Center.

☐ **JACKSONVILLE, FLORIDA**

Programmer/Analysts with U1100 COBOL experience for the Navy's Data Processing Service Center (DPSC) program.

☐ **SEABROOK, MARYLAND**

Programmer/Analysts with IBM 360/370 experience in COBOL, Fortran, JCL, ALC, PL1, or TSO. Systems Programmers using DBMS, OS, VS1, VS2, MVS, and MVT to work on our NASA Goddard Space Flight Center program.

☐ **BAY ST. LOUIS, MISSISSIPPI**

Electronics Engineers with experience in analog circuit design, instrumentation, digital logic design, computer interface design, or microprocessors for the National Space Technology Laboratory (NSTL) program.

☐ **RIDGECREST, CALIFORNIA**

Programmer/Analysts with U1108 COBOL EXEC 8 experience for our Naval Weapons Center program.

Along with choice locations, CSC offers you competitive salaries and a fully paid company benefits package.

For immediate consideration, please send resume with salary history to:

Gus Siekierka
Director, Industrial Relations

COMPUTER SCIENCES CORPORATION

Applied Technology Division
6565 Arlington Boulevard
Falls Church, Virginia 22046
Major Offices and Facilities throughout the World
Equal Opportunity Employer M F

APL SYSTEM PROGRAMMER

Scientific Time Sharing Corporation, world leader in APL time sharing services, is seeking applicants for the position of APL System Programmer. This position requires an individual able to help develop and maintain our proprietary APL system software. Applicants should have a working knowledge of APL system internals or wide experience with equivalent large software systems such as HASP or VM. STSC offers a competitive salary, excellent health benefits, a challenging and exhilarating work environment, access to our AMDAHL 470 computer, and the opportunity to join innovative professionals in the development and use of APL.

Please send letter and resume to:

John W. Myrna
Scientific Time
Sharing Corp.
7316 Wisconsin Ave.
Bethesda, MD 20014

PROGRAMMERS AND ANALYSTS

If you are a programmer, programmer analyst or systems analyst and would like the most individualized job search offered in the data processing field today, either on a local or national level, send your resume in confidence to either location

CINCINNATI	DALLAS
[illegible]	[illegible]

We are a major health products corporation located in Southern California, with immediate openings on our professional staff. Our South Bay Long Beach data center has two 370/145's under DOS/VS and CICS/VS. We also have a distributed processing network with multiple System/7's, 3740's, and System/3's, with expansion to System/34's planned in the near future. We offer growth potential and excellent benefits. The following openings are available:

SYSTEMS PROGRAMMER

Successful candidate must have a minimum of 2 years recent experience as a Systems Programmer in a DOS or a DOS/VS environment. VS/1 experience preferred. This is an excellent opportunity for an individual willing to learn DOS/VS and CICS/VS. Salary commensurate with experience.

SR. PROGRAMMER ANALYSTS
PROGRAMMER ANALYSTS

Senior Analyst requires a minimum of 5 years experience and Programmer Analyst requires 3 years experience in inventory control, physical distrubtion, and/or sales reporting, including systems design, project planning and control, user interface, specification writing, and COBOL programming. Must have good communication skills and be able to provide direction to others on a project basis. Knowledge of HIPO and structured programming a plus. Degree preferred.

For immediate consideration, send resume with salary history, in confidence to:

Bergen Brunswig Corporation

D. Dohner
Employee Relations
P.O. Box 1973
Long Beach, CA 90802
Equal Opportunity Employer M/F

Challenging Career and Beautiful Lifestyle for Programmers and Systems Analysts

Tall mountain peaks, lush pine forests, and sparkling streams provide a setting of natural beauty for Dominion Bankshares Corporation, a dynamic multi-bank holding company in Virginia. With 123 state-wide offices, Dominion has a record of performance few can match. Our earnings and dividends have increased EVERY YEAR since we incorporated.

And performance is what we look for in people. We are seeking career candidates who want to excel and who can take advantage of an environment that encourages individual achievement.

Successful applicants will work in a twin 370/158 OS/VS1 environment located at our corporate headquarters in the scenic Roanoke Valley. COBOL and CICS programmers will be involved with such applications as Demand Deposit Accounting (DDA) and Central Information-File (CIF). Analysts will work with DDA and CIF, and one analyst position will be reserved for someone with Mortgage Loan applications experience.

If an outstanding company and a great place to live is the combination you've been after, call Barry O'Donnell, Assistant Personnel Officer. (703) 362-7681. Or send a resume including current salary to Corporate Personnel Unit, Dominion Bankshares Corporation, P. O. Box 13327, Roanoke, Va. 24040. All replies will be held in confidence.

Dominion Bankshares Corporation

An Equal Opportunity Employer, M/F

MINI/MICRO
Software-Firmware-Hardware

NATIONAL OPENINGS in the rapidly growing minicomputer and microprocessor fields, including design of computers and peripheral hardware and software, and all forms of applications. Fortune 500 and growing regional firms in 35 states. All searches COMPLETELY CONFIDENTIAL. Company clients pay all fees, interview, relocation, etc. Sample openings include:

Real Time/Interactive Sys	$18-29K
Firmware Engineering	$16-24K
RSX-11M Experience	$18-30K
INTEL/Motorola Micro Coding	$18-26K
Diagnostics	$18-30K
Simulation Programming	$15-25K

CALL TOLL FREE 24 HRS./DAY
1-800-821-2270 EXT. 605
(In Mo. 1-800-892-7655)
Ralph Stevenson, V.P.
Jim King and Associates

438 Gulf Life Tower Jacksonville Florida 32207
(904) 398 7371

CADILLAC EDP OPPORTUNITIES
ALL FEE PAID NATIONWIDE COVERAGE
CONFIDENTIAL

CADILLAC offers you assistance in finding a position that meets your objectives. . . NATIONWIDE or in your present locality. For 45 years CADILLAC has been helping professional people find new positions that offer greater growth more responsibility, new experience, relocation, higher salary, etc. . . . we'll make every effort to do the same for you. Just send your resume, or a note outlining your experience. . . no cost or obligation to you.

Sys Prog (Tech Support)	$20-30	Prog (Applications)	$14-20
Sr. Anal/Proj Mgrs	$22-30	Prog (MINI, POP, etc)	$16-23
System Anal	$20-25	EDP Auditors	$18-22
Prog/Anal	$16-22	Managers IBM Sys/3	$16-23

Mark Fuller
CADILLAC ASSOCIATES, INC.
32 W. Randolph St., Chicago, IL 60601
(312) 346-9400

PROGRAMMER/ANALYST
PROPERTY MANAGEMENT

VEDA INC., a national engineering and consulting firm, is seeking an individual with the following qualifications to join in the development of a new D.P. division.

WANTED:
- Innovative analyst/programmer
- Capable of assuming project responsibility
- Comfortable interacting with customers
- Preferably experienced in property management

TO:
- Develop computer software systems immediately
- Train and supervise technical support personnel as req'd. to support national marketing effort

Be there for this ground floor opportunity and advance with the growth of the company. We have the experience and environment necessary for talented people to succeed. To inquire call: (703) 979-2700 or send resume to:

VEDA INCORPORATED
1755 Jefferson Davis Highway
Suite 708, Arlington, VA 22202
ATTN: J. Redmon, D.P. Services Mgr.
An Equal Opportunity Employer M/F

D P MGR
Mid-New Hampshire

Growing $40M Company seeking Mgr. of 370/125 with multi-plant data comm. network. Must have systems and management experience. Must be able to interface with senior mgt. Mfg. experience and degree required. Send resume with salary history to:

CW Box 1385
797 Washington St.
Newton, MA 02160
Equal Opportunity Employer

EXECUTIVE RESOURCES
SERVING THE NATION FROM DAYTON

Since 1968
40 S. Main St., Suite 615
Dayton, Ohio 45402

24 Software Programmers	$15-23,000
2 Digital Design Engineers	$23-30,000

100% Employer Paid Fees. Send your resume in confidence.

INTERESTED IN A GOOD JOB? WE HAVE A PLACE FOR YOU

Growing South Louisiana Co.

Has Openings For:
- Cobol Programmer
- Senior Programmer/Analyst
- Senior Analyst

Experience with IBM System 370 Model 135, DOS/VS with 256K real storage or larger system is desirable.

IF A CHALLENGE APPEALS TO YOU, SEND COMPLETE RESUME TO PERSONNEL MANAGER, P.O. Box 2607, MORGAN CITY, LA. 70380.
We are an equal opportunity employer, M/F

RESEARCH PROGRAMMER

Provide statistical and technical support for a variety of research projects. Experience with program support for DEC system-10 and IBM 360 preferred. Atmosphere busy, informal and dedicated to client services. Excellent fringe benefits. Application deadline 1-31-78.

Send resume to: Personnel Service Office, Ball State University, Muncie, Indiana 47306. An Equal Opportunity/Affirmative Action Employer.

MARKETING REPS. EMULATOR SYSTEMS $50,000+

A rapidly growing company in the computer industry is building an unparallel, national sales staff to market emulator systems. Qualified candidate will have a degree in Computer Scinece, knowledge of dynamically, alterable control logic and excellent under skills with business understanding. Company offers above average base salary ($25K) plus commissions in the $25-30K range, full benefits, stock options and high management potential. Interested applicants should call our nearest office and ask for Job #10-2L.

SALES ENGINEER MINI-COMPUTERS $35-$40,000

Due to expansion, a major manufacturer of mini-computers is seeking a person with 3 plus years experience as a Sales Engineer, selling to the Process Control industry. The qualified candidate will have a degree, be a strong sales professional and/or previous sales manager. Company offers car, plus all expenses, full benefit package and will expose you to one of the best and most secure working conditions in the industry. For more information regarding this position, call our nearest office and ask for Job 10-3JS.

....OTHER POSITIONS NOW OPEN....

Sales-Ter. Equip.	$30-35K	S/T-EDP Software	$25-28K
M/R-Telemetry Syst.	$25-35K	S/E-Time Sharing	$24-28K
S/E-Microfish Print	$26-28K	Sales-Computers	$18-25K
S/E-CRT Word Process.	$35-40K	S/E-Mag Machines	$20-23K
M/R-Time Sharing	$20-24K	S/E-Comp. Ctrls.	$20-25K
		Market Research	$25-35K

SALESworld, inc.

Atlanta-2965 Flowers Rds, Atlanta, Ga 30341 (404) 458-8981
Baltimore-300 E. Joppa, Towson, Md 21204 (301) 296-5600
Boston-460 Totten Pond Rd, Waltham, Ma 02154 (617) 890-1500
Chicago-9801 W. Higgins Rd, Rosemont, Il 60018 (312) 692-9000
Cleveland-20950 Center Ridge Rd, Cleve, Oh 44116 (216) 333-9440
Dallas-1111 W Mockingbird, Dallas, Tx 75247 (214) 638-5081
DC-7926 Jones Branch Dr, McLean, Va 22101 (703) 821-1850
DT-30100 Telegraph Rd, Birmingham, Mi 48010 (313) 647-7400
Houston-9800 N.W. Freeway, Ho, Tx 77092 (713) 681-8485
LA-10880 Wilshire Blvd, LA, Ca 90024 (213) 475-8601
Phil-1150 Ist Ave, King Of Prussia, Pa 19406 (215) 337-0170
Toronto-145 King St W, Tr, Ontario M5H 1J8 (416) 364-5500

Computer Systems Engineer

Develop new products and software including operating systems, language processors and application packages for building automation, energy management and process monitoring/control. Position requires a strong background in real time programming, primarily FORTRAN. Mini or micro computer experience an asset.

Send resume stating qualifications to.

Robertshaw Controls Co.

Attn: A.J. Falco, Personnel Manager
P.O. Box 27606
Richmond, Virginia 23261
An equal opportunity employer, M/F

PROGRAMMING MANAGER
HONEYWELL 66/10
HOSPITAL

Large teaching hospital in heart of Penne. Dutch Country has growth opportunity for person on the way up the D.P. ladder. Successful candidate will have appropriete academic credentials end be highly motiveted in developing new softwere packages. Will function as number two in department. Honeywell 66/10 hardware and COBOL experience hold high priority in selection process. Attractive starting salary with excellent benefits. Apply in confidence to: W.B. Harris, Director of Employee Relations, Lancaster General Hospital, 555 North Duke Street, Lancaster, PA 17604. (717) 299-5511

Sales Incentives

Man of the Year

Your personal track record indicates outstanding sales achievement and the ability to deal in large volume sales with corporate executives. Your current earnings are between $30-$75,000 and you've developed a flair for creative solutions to marketing problems. Now you're seeking new challenges, more responsibilities and greater financial rewards.

We offer all this and more! As designers and marketers of merchandise and travel incentive programs (such as President's Club and Leader's Council) for the biggest names among the Fortune 500 companies, we need highly motivated sales/marketing executives to join our dynamic marketing team.

Find out about this exciting and unusual opportunity by sending a letter or resume to:

John Jack

Business Incentives, Inc.

P.O. Box 1610
Minneapolis, MN 55440

An Equal Opportunity Employer

SUNNY SOUTH

DATA PROCESSING CAREER OPPORTUNITIES

Programmer Analyst	*Atlanta*	*$14,000 - $16,000*
Programmers (Several)	*South Carolina*	*$13,000 - $16,000*
E.D.P. Auditor (Several)	*Atlanta*	*$15,000 - $17,000*
Operations Manager	*Georgia*	*$18,000 - $21,000*
Programmer Analyst (CICS)	*Atlanta*	*$17,000 - $18,500*
Programmer (Systems III)	*Atlanta*	*$15,000*
Data Center Manager (Operations)	*South Carolina*	*$26,000*
Systems Analyst (Insurance)	*South Carolina*	*$22,000*
Consultant (Insurance)	*Atlanta*	*$30,000*
Systems Programmer (Mini)	*Atlanta*	*$20,000*
IMS Internals Specialists	*(Several)*	*$35,000*
Scientific Programmer	*Florida*	*$22,000*
Systems Programmer (MVS)	*Atlanta*	*$22,000*
Systems Analysts	*Florida*	*$19,000*
Systems Analysts	*North Carolina*	*$20,000*
Programmer Analysts (Several)	*Alabama*	*$18,000*
Sales Reps. (Many)	*Atlanta*	*Salary + Comm.*
Sr. Systems Analysts	*Georgia*	*$22,000*
Sr. Systems Analysts	*North Carolina*	*$23,000*
Programmers (Many, All Levels)	*North Carolina*	*$19,000*
CPCS Applications	*Atlanta*	*$17,500 + O.T.*

100's Of Other Positions Throughout The Southeast

Send Resume or Call (404) 659-4141

FOX AND ASSOCIATES, INC.

EDP Recruiters

2104 CAIN TOWER/229 PEACHTREE STREET N.E./ATLANTA, GEORGIA 30303

REAL-TIME PROGRAMMERS

NCR's Terminal Systems Division in Millsboro, Delaware is a high volume manufacturing facility concerned with the design and production of POS terminals. We are currently experiencing substantial increases in Engineering activity and as a result have immediate needs for programmers interested in growth opportunities.

Desired Experience

-Systems

- I/O Drivers
- Diagnostics
- Operating Systems

-Applications

- Vocationally oriented to the Retail Market
- Peripheral development to include scanners, communications, data collection, etc.

Basic Qualifications

- 1-3 years experience in Assembly language with mini or microcomputers
- 8080 experience a plus
- BS in CS, EE or Math

In addition to excellent career opportunities with NCR, our Millsboro location is right in the heart of the Delmarva Peninsula, better known as the "land of Pleasant Living." We're just minutes from marine recreational areas, wildlife preserves and the nation's finest beaches.

Please send resume with salary requirements:

Ron Tull, Dept. C-116
Terminal Systems Division
NCR Corporation
P.O. Box 607
Millsboro, DE 19966

NCR

PROGRAMMER-ANALYST

IBM SYSTEM-3/12, requires an individual with proven programming expertise in RPG II, as well as analysis experience. Prior operations supervisory experience as well as some knowledge of SPOOLING, DUAL PROGRAMMING, and CCP is a plus.

Qualified applicant will assist Director in design and programming of new applications as well as assume partial responsibility for job scheduling and computer operations.

Please send resume in confidence stating, employment history and salary, work experience and salary requirements to:

Mr. M.H. Gross, Director of Data Processing, Gottesman and Company, Inc., 100 Park Avenue, New York, N.Y. 10017. An Equal Opportunity Employer.

VIRGINIA
PDP 11

Systems Programmer and (4) Applications Programmers needed by this progressive Virginia company. Beautiful location, excellent opportunity to get in on ground floor of a new installation environment. PDP-11, DIBOL, BASIC +, OS 2780 Protocall, DECNET, TP, RSTS.

Call or send resume to
Data Processing Department
PERSONNEL PLACEMENT
537-D Huffman Mill Rd.
Burlington, NC 27215
(919) 584-5591

SOFTWARE SPECIALIST

(Attractive Southern Location)

We have a new position that will offer the right candidate a variety of responsibility exposure. The person we select will have:

- 3-5 years software experience
- BOMP or DBOMP
- T/P Moniter, CICS, CCP, TOTAL
- Manufacturing environment

If you believe you qualify, send your resume to:

F.A. Harrision
TPI Corporation
P.O. Box T-CRS
Johnsan City, TN 37601
E.E.O. M/F

PROGRAMMER
Medical/Research

We are currently seeking a qualified individual to join our staff as a Medical/Research Programmer. This represents an excellent opportunity to sharpen your Data Processing skills in a small, research-oriented department within our hospital.

The successful candidate will possess an AAS degree (BS preferred) or equivalent work experience, have a good knowledge of BASIC or FORTRAN, and have a background in statistics, math and/or general programming. We will also consider a recent graduate.

Duties will include light program writing, medical records maintenance (computerized), research programming support and possibly some systems work.

We offer an excellent salary and benefits package that includes free health and life insurance and paid vacation and holidays. Please submit your resume, including salary history and current requirements, to:

CW Box 1384
797 Washington St.
Newton, Mass. 02160
An Equal Opportunity Employer M/F

COLOR VIDEO SENIOR DESIGN ENGINEERS

Requirements:
EXPERIENCE
DEDICATION

VAS Corp.
2525 Maricopa
Torrance, Ca. 90503

Salary open, send resume or call

Attn.: R. Zegers de Byl
Phone: (213) 320-8334

MANAGER OF IBM SOFTWARE SYSTEMS

The J. Preston Levis Regional Computer Center is seeking an experienced systems programmer who is ready for significant management responsibilities. JPLRCC operates one of the largest computer facilities in northwest Ohio, and serves many agencies and institutions in the area with a wide variety of applications. We are located in suburban Perrysburg, near Toledo and convenient to several major metropolitan areas. This position reports to the Director of Systems and Development, and is considered senior management.

The successful applicant will have expertise in the generation and maintenance of VS or OS and either HASP or JES2, and will have demonstrated leadership abilities. In addition to the management duties normally associated with such a position, this individual will play a key role in the evaluation and selection of a new and major IBM-compatible computer. Familiairty with the latest hardware and software is therefore highly desirable.

The salary for this position is negotiable and dependent on qualifications, but will be competitive. A full fringe benefit package applies, including 4 weeks of vacation annually and educational benefits. If you feel that you fill the qualifications for this position, and if you would like to play a significant role in a dynamic center,housed in an attractive surburban environment with excellent coworkers, we would like to hear from you. Send resumes and salary histories to:

Personnel Officer
JPLRCC
25875 Dixie Hwy.
Perrysburg, Ohio 43551
An Equal Opportunity/Affirmative Action Employer

PROGRAMMERS

PADRE ISLAND

SOUTHWEST

Our Las Vegas promotion worked so well we are going one step better. . . Computer Logic will pay for one week in a beachfront condominium and a fishing excursion to Mexico for any programmer for whom we obtain amployment up to June 30, 1978. For the top DP professionals, we have numerous openings.

- Data base Prog/Anals. To 24K. IMS/CICS design & programming.
- ALC Programmers/OS. To 22K.
- OS/DOS COBOL. To 20K.
- PL-1/Mark IV. To 19K.
- Mini computar Programmers.

These are "Sun Belt" permanent positions; employer paid relocation and fees.

If you want to step up to "STATE OF THE ART" data base systems or advance your career in 1978, call for an appointment and come in and relate your skills, salary and personal needs to local or national situations. We specialize in "CAREER PLACEMENT OF D.P. PROFESSIONALS".

JERRY BEATTY, 214-243-5051

COMPUTER LOGIC, INC.
Parsonnel Consultants
2655 Villa Creek Dr., No. 287, Dallas, TX 75234

Our parent company, PPS, Inc., has permanent long-term consulting positions available for OS, COBOL and/or data base professionals, analysts and programmer/analysts. If you've ever wondered what consulting is all about, please contact us!

An equal opportunity employer

REWARDING OPPORTUNITY WITH A LEADING DATA BASE/ DATA COMMUNICATIONS VENDOR

Insyte Datacom is expanding *again!* Growing domestic and foreign markets for DATACOM DBMS & TP software require immediate investment in innovative DP professionals for systems engineering, customer support, sales and programming. Must have 3 to 5 years experience on IBM 360/370 series DOS and/or OS. Insyte Datacom is ideally located in dynamic Dallas, where you and your family can enjoy a secure future and full utilization of your professional skills. Insyte Datacom, a wholly owned subsidiary of Insyte Corporation, a public company, offers excellent advancement opportunities and company benefits. Please send resume today to Orrin Stevens for immediate consideration.

insyte datacom

214/526-4280
3707 Rawlins St Dallas TX 75219
Boston Chicago Denver San Francisco MexicoCity Frankfurt W Germany Sydney Australia

---

FLORIDA

Why freeze when you can be in warm sunny Fla-We have orders We need Applicants!

P/A 370/DOS/VS CICS	to 16K
SYS/PROG 370 DOS or OS	to 20K
SCIENTIFIC-any equip	to 18K
P/A large Burr	to 18K
Scientific-Graphics	to 19K
PROG COBOL or BAL	to 16K
P/A NCR Bnkg	to 17K

ROBERT HALF
PERSONNEL AGENCIES
311 N. Westshore Blvd.
Tampa, FL 33607
(813) 876-4191

FEDERAL EXPRESS

Americas Airline for Packages

DATA PROCESSING

We are now accepting resumes for SYSTEMS ANALYSTS and PROGRAMMER ANALYSTS to work on various applications in our Systems and Programming Department. We prefer experience in large on-line systams. All applicants must be proficient in COBOL.

If you desire to work in a challenging, innovative department that anticipates extensive growth potential, please contact us directly. All resumes will be kept in strict confidence.

Kay Coop
Personnel Specialist (CW)
Federal Express Corp.
AMF Box 30167
Memphis, TN. 38130
(901) 369-3245

Equal Opportunity Employer M/F

SYSTEMS PROGRAMMER

Connecticut based service organization urgently needs people with Amdahl 470 or IBM 370/168 MVS, BAL. Experience with MVS internals, dump analysis, design and implementation of system software. $23,000 plus. Fee Paid.

ROMAC & ASSOCIATES
342 North Main Street
West Hartford, CT 06117
(203) 232-4811

COMPUTER SYSTEMS ENGINEER

Requires applicable college degree plus 2 years experience. VS1 and VM experience most desirable. Send resumes to Commonwealth of Virginia, 201 8th Straet Office Building, Richmond, VA 23219, Attn: Bobbie Hughes. Eoe

---

EDP SOUTHEAST

Prog: OS, Cobol	$18K
Sr. Prog: CICS	$20K
Software: DOS	$22K
Software: OS	$24K
Sys Anal: Mfg.	$25K

Several positions open in the above catagories with leading Southeastern companies. Mail confidential resume or call Joe Sawyer, the EDP Personnel Specialist, (803) 233-2546.

EXCEL PERSONNEL
1421 Laurens Road
Suite 200A
Greenvilla, SC 29607

SENIOR FORECAST ANALYSTS

Here is an exceptional opportunity for an experienced professional to join the fastest growing minicomputer company in the business. Data General. In the last nine years our sales have gone from $1 million to over $254 million. And we're going to keep on growing. Presently we are seeking candidates for our CORPORATE MANUFACTURING planning department with computer industry exposure and specialized knowledge of CPU and peripheral products. Your responsibilities will include evaluation of market demand, marketing strategies, and business forecasts for impact on production plans. You will be required to recommend appropriate production strategies to optimize delivery capability within specific risk limitations and develop and implement tools and techniques in support of the above tasks. Requirements include 4 years experience in market and/or manufacturing forecasting and planning functions. A technical degree is required; an MBA preferred.

If interested in the above position, please send your resume, including salary history, to Barry S. Davis, Data General Corp., 15 Turnpike Road, Westboro, MA 01581 or call him at 1 (800) 225-7347, ext. 4511; in Massachusetts call collect (617) 366-8911, ext. 4511.

Data General
An equal opportunity employer M F

Honeywell 6000 Programmers

We are assisting one of our suburban Boston area clients in locating qualified Honeywell 6000 programmers. This is an opportunity for you to learn first hand about an unusual opportunity without becoming directly involved with a potential employer. Clip and mail the enclosed coupon. I'll contact you at your convenience and answer any questions you may have about this or other opportunities.

Date ____________
Name ____________
Address ____________
Phone ____________
Best Time to Call ____________
Honeywell 6000 experience ____________ years
Other Data Processing Experience ____________

Timothy D. Crowe, Jr.
Personnel Consultant
Box 6
Chelmsford, Mass. 01824
An equal opportunity employer, M/F.

dca

COMPUTING AND COMMUNICATIONS CAREERS IN ATLANTA

Digital Communications Associates, Inc. is an Atlanta-based manufacturer of computer communications networks. Our networks interconnect clusters of asynchronous terminals with one or more host computers. Our networks are the most advanced in our market, offering statistical multiplexing, end-to-end error control, port contention, circuit switching and centralized network management in one integrated package. Our fast growth has created the following new positions for talented persons with a commitment to quality work and a record of successful accomplishments.

Manager of Customer Support

Responsible, mature individual to lead a team of customer support personnel. Responsibilities will include internal acceptance and installation of networks as well as fault isolation and repair. Applicant must have progressively responsible experience in support or operation of digital communication networks; familiarity with minicomputers is desired. Applicant must possess good interpersonal skills and be capable of communicating well with all levels of customer personnel, both in person and on the telephone. Bachelor's degree or equivalent experience is required.

Customer Support Engineer

Experienced service engineer to install, diagnose, and repair networks which utilize state-of-the-art hardware and software. Assembly language experience with minicomputers (PDP-8) and microprocessors (Z-80) is desired; experience with communications equipment (e.g. multiplexors and modems) is required. A degree in a relevant field is preferred. Applicant will travel about one week per month.

Programmer/Analyst

Highly capable person to develop, document, test, and support in a team environment both software tools and data manipulation systems for engineering, sales, and manufacturing departments. Applicant must possess knowledge of commonly used software-tool structures, must be capable of working in assembly language, and must be committed to using recent advances in program development methodology. Applicant must have substantial experience in constructing data manipulation and processing systems for technology-based corporations. Experience on the DECsystem-10 is desired. Bachelor's degree or equivalent experience is required.

Senior Software Engineer

Mature, capable person to conceptualize, develop, document, test, and support in a team environment operational and diagnostic software and firmware for network and front-end processors. Applicant must be a problem solver, designer, implementer, and communicator, well-grounded in software system theory and practice, and familiar with psychological, managerial, and economic issues involved in the construction and maintenance of software systems. Applicant must have some knowledge of digital hardware. Advanced degree (M.S. or Ph.D.) or equivalent experience is required.

DCA is a small, high-technology but people-oriented team of professionals working at the state-of-the-art in manufacturing commercially viable private computer communication networks. We maintain an informal, technically challenging, professional work environment in a heavily wooded research park situated in an Atlanta suburb. We offer competitive salaries, liberal fringe benefits, and excellent opportunities for career growth and advancement. If you are interested in one of these positions, please reply by letter of application and resume to our Personnel Director at P.O. Box 73, Norcross, Georgia 30092. DCA is an equal opportunity employer; we invite people to work with us based on their talents and capabilities, not on the color or shape of their skin.

DATA PROCESSING CAREERS

IN SCENIC NEW HAMPSHIRE

Unparalleled growth and internal expansion has created numerous career opportunities at all levels for experienced data processing professionals.

Immediate openings now exist for the following positions:

Project Leaders
Systems Analysts
Programmer/Analysts
Programmers

We are the data processing center for American International Group, one of the world's largest and most prestigious insurance organizations currently doing business in 130 countries.

We are a progressive installation utilizing an IBM 370/158 with VM, CMS, CICS, OS/VS1 software. Major on-line data based systems are under development.

If you would enjoy working in a highly professional environment located near nationally famous ski resorts and the lakes region of New Hampshire, please send your resume, including salary history and requirements in strict confidence to:

Personnel Director
American International Group
Data Center, Inc.
1750 Elm St., Manchester, NH 03107

A Member Company of
American International Companies
An Equal Opportunity Employer, M/F

PROGRAMMERS/ SYSTEMS ANALYSTS

Openings currently exist at all levels for individuals possessing a background in the following areas.

- **Microprocessors**
- **Minicomputers**
- **Operating Systems**
- **Distributed Processing Networks**
- **Systems Simulation/SIMSCRIPT or GPSS**
- **Systems Constructors & Generators**
- **8080 Assembly**
- **assembly & COBOL Languages**

We welcome responses from recent graduates with a BS in Computer Science as well as experienced personnel.

To investigate these opportunities, please send your resume and salary requirements to:

J.E. Chorazewitz
Engineering & Manufacturing · Dayton
Employment, CW-116
NCR Corporation
Dayton, Ohio 45479

NCR

An Equal Opportunity Employer

TOLL FREE

800/633-6644

In Alabama Call Collect
205/328-2931
24 Hr. Telephone Service

SUNBELT SERVICE

EDP AUDIT/MFG	25K
EDP CONSULTANT	24K
BANK EDP ANALYST	23K
SYS ANALYST/MFG	22K
PROJ LDR, NCR	22K
PROG MGR/INS/370	22K
SYSTEMS PROG	22K
PROJ LDR/MFG/370	20K
OPERATIONS MGR/370	20K
S/+ SPECIALIST/MFG	20K
NCR, BANK, P/A	20K
P/A, UNIVAC, T/P	20K
LIFE INS, 370, P/A	20K
MFG PROG/ANALYST	19K
EDP MGR, HONEYWELL	18K
COBOL PROG.	18K
P/A, HONEYWELL	18K
COBOL PROG.	18K
BURROUGHS PROG	18K
P/A, HONEYWELL	18K
EDP STAFF AUDITOR	17K
ANALYST/370/MFG	17K
PDP PROG.	16K
P/A, BANK 370	16K
SYSTEM/3, P/A, MFG	15K

Representative listing of current southern opportunities. Additional positions available in south and nationwide. All fees paid. Call Ole Olson or mail resume for fast, confidential service

GENERAL PERSONNEL CORPORATION
Brown Marx Bldg
Birmingham, Ala. 35203

Programmer

SENIOR PROGRAMMER

Minimum 3 years COBOL plus on-line and data base programming experience utilizing large scale IBM 370 type hardware. Knowledge of OS-JCL and utilities a must. Our on-line environment consists of 3270 compatible terminals with INTERCOMM as our teleprocessing monitor and TOTAL as our DBMS.

If you feel you qualify for the above position, please send resume including salary history in confidence to:

C.E. TYLER

Industrial Products
8200 Tyler Blvd.
Mentor, Ohio 44060
Equal Opportunity Employer M/F

STUDENT SCHEDULING SPECIALIST

Denver, Colorado Area

Jefferson County School District has an immediate opening for a user liaision specialist with a college degree, preferably in education or computer sciences, and four years experience in system analysis, programing, data processing user liaison, or student scheduling. Desire specific experience with the EPIC: SOCRATES scheduling system in an IBM 370 DOS CICS data base environment. Salary is in the 20-25,000 range with an excellent benefits package including four weeks vacation. Please send resume in confidence to:

James E. Engel
Computer Services Department
13300 W. Ellsworth Ave.
Golden, Colorado 80401
An Equal Opportunity Employer

PROGRAMMING PROFESSIONALS

your background and abilities in programming and design are needed by our major clients throughout the U.S.A.

Immediate openings exist for accomplished professionals in both programming and systems design. Applications include the implementation of an integrated insurance processing system as well as financial and business systems e.g. IBM 370/168's under MVS.

SENIOR PROGRAMMERS/ ANALYSTS

You should have two to five years of programming experience on large-scale IBM 360/370 systems with emphasis on insurance or general financial application and IBM COBOL experience Data base experience is desirable for some positions as is knowledge of IMS-2, PL/1, OS, JCL, and/or assembler language.

SYSTEMS DESIGNERS

A minimum of four years of EDP experience is required including programming and systems design for large-scale equipment. Also required is a knowledge of financial and accounting applications and a knowledge of COBOL.

Interested individuals are invited to forward resume stating current salary in confidence to:

BRITT AND COMPANY, INC.

AFFIRMATIVE ACTION SPECIALISTS
One Bala Cynwyd Plaza
Suite 315-17
Bala Cynwyd, PA 19004
(215) 667-0958
All Positions Fee Paid

systems software

Mergenthaler Linotype is a world leader in the innovative development of computerized photocomposition and phototypesetting systems. These systems utilize minicomputers, micro-processors, mass memory devices, video display terminals and a wide range of phototypesetters.

Our continued growth has created openings in the following disciplines:

***LEAD TEST ANALYST (EDP Auditor)**—B.S. in Computer Science. Minimum 6 years' experience in large systems and minicomputers. Knowledge of acceptance testing. Typesetting background preferred.*

***SOFTWARE ENGINEERS**—B.S. in Computer Science with 2-4 years' experience in programming in Assembly language and at least 1 year programming minicomputer software operating systems.*

***LEAD SOFTWARE WRITER**—Minimum of 2-4 years' technical writing for computer systems. Knowledge of programming documentation, format specification and software development coordination.*

***DIAGNOSTIC PROGRAMMER**—Minimum 2 years' experience in digital and analog troubleshooting and 1 year's diagnostic or Real Time Assembly language programming.*

If you have expertise in phototypesetting, photocomposition, or computerized word processing systems, we would like to talk with you. We offer an excellent compensation package which includes extensive company-paid benefits and in-house Master's level educational program.

Mergenthaler
an **Eltra** company

Please indicate your area of interest and send your resume with salary history/requirement to:

Edward S. Schneiderman,
Manager, Industrial Relations

Mergenthaler Linotype Company
Mergenthaler Drive
Plainview, New York 11803

equal opportunity employer m/f

COMPUTER PROFESSIONALS

A recent Management decision to design and implment a centralized corporate Data-Base has created the need for highly motivated and competent professionals who will participate in the development, installation and maintenance of all corporate systems.

PROGRAMMERS, ANALYSTS

Responsibilities will include development of various corporate applications in an IMS Data-Base environment. Candidates should be experienced with OS/JCL, COBOL and highly disciplined in their programming techniques. Education and training will be provided to individuals without an IMS background.

SYSTEMS PROGRAMMERS

Responsibilities will include implementation, maintenance and performance analysis of IMS/VS DB/DC systems. Candidates should have a minimum of three years working experience in the maintenance of IMS/VS system with sound working knowledge of SVS internals.

TRAINING CO-ORDINATOR

Responsibilities will include the development of effective training programs, conducting classroom instruction and analysis of program effectiveness. Candidate should have a degree, preferably in Math or Computer Sciences, with 3-5 years programming experience and have effective communications skills.

Individuals whose background match the above requirements and who are looking for advancement should send a resume detailing work history, education, training and salary requirement to:

Personnel Department
M. LOWENSTEIN & SONS, INC.
Information Services Division
P.O. Drawer 10232
Rock Hill, S.C. 29730

WE'RE #1

Of 180 recruiting firms* competing throughout the U.S. we were #1 in EDP placements (& we produce more than #2, #3, & #4 COMBINED!) Our clients are nationwide, many on an exclusive basis, and represent a full spectrum of industries, size & needs. IF YOU ARE EVEN THINKING of a change, you can't afford not to contact us. All fees, costs, and temporary living expenses are paid by the companies.

Sr. Sys. Prog (S) MVS/OS Internals	$22-28K
Sys Prog (S) OS/VS/MVS/SVS	$20-26K
Mini Tech Analyst DEC/COBOL/R&D	$25-30K
Proj Leaders IMS/VS COBOL/PL-1	$20-26K
Sys Analyst IMS/VS COBOL/PL-1	$20-24K
Prog Anals OS/DOS	$14-20K

*National Personnel Associates - Offices Throughout the U.S.
Bill Denny, V.P.

CALL TOLL FREE 24 HRS./DAY
1-800-821-2270 EXT. 605
(In. Mo. 1-800-892-7655)

Jim King and Associates

438 Gulf Life Tower/Jacksonville, Florida 32207
(904) 398-7371

Programmer/Analyst

OPPORTUNITY KNOCKS with the right position just once in a lifetime

JOHNS HOPKINS is where the right person could soar in their career and where the environment is filled with challenge, excitement, colorful surroundings and OPPORTUNITY

Our highly respected Information Systems Department has been used as a model by organizations throughout the country. The successful candidate will have related college training and progressive experience in the following areas:

- Three to four years programming COBOL, of which one to two years was using the MSA General Ledger, Cost Allocation and Budget Systems. IBM 370 OS.
- Four years programming in COBOL and ALC for IBM 370 OS. CICS helpful.

We offer much in the way of compensation and benefits, including FREE BLUE CROSS/BLUE SHIELD/MAJOR MEDICAL, three weeks vacation, annual raises, etc.

If you'd like more information or a chance to see for yourself the advantages of working at JOHNS HOPKINS, give us a call or send a resume describing your experiences.

THE JOHNS HOPKINS MEDICAL INSTITUTIONS

Office of Professional Recruitment
624 N. Broadway
Baltimore, Maryland 21205
(301) 955-5589
An Equal Opportunity Employer M/F

SENIOR SYSTEMS PROGRAMMER

Educational network serving 15 colleges and universities. 360/MVT - 370/SVS with HASP 4.0 shared spool, MILTEN/WYLBUR. Maintain and enhance O.S., plan and implement hardware and software upgrades. MVT and/or SVS systems programming experience, assembler and higher level language proficiency required; College degree preferred. PL/I, HASP, shared spool, MILTEN/WYLBUR experience a plus. Salary commensurate with experience. Send comprehensive resume no later than January 31, 1977 to J. William Strider, WVNET, 837 Chestnut Ridge Road, Morgantown, WV 26505. An Equal Opportunity Employer M/F.

FLORIDA OPPORTUNITIES

Analysts/Programmers

Seeking promotion and greater personal potential in an ideal environment for you and your family — SUNSHINE year around.

$18,000 To $35,000
Client Companies Pay All Fees Plus interview & Relocation Costs

Degree and two or more yrs. experience. CRITICAL needs in these areas: DBM, CICS, Systems Internals, Time Share, Communications.

Please submit resume and present salary and we will respond promptly.

FRANK LEONARD Personnel
1211 No. Westshore Blvd.
Suite 100
Tampa, Fl. 33807
(813) 872-1853

SOFTWARE ENGINEERS

Boeing Computer Services currently has openings in Wichita, Kansas, for persons with skills in design, development, integration and test of software on special purpose simulation computers and/or end item computers for real-time aircraft, aerospace and special purpose systems. This includes the engineering design and integration of the computer software system with simulator, airborne and/or special purpose hardware.

Applicants must possess:

- College degree in Engineering (preferably EE) or Computer Science with Engineering emphasis
- 3-5 years experience
- Proficiency in FORTRAN

In addition to excellent salary and benefits, our Wichita location offers the advantage of a modern progressive city with plenty to do and lots of fresh air and sunshine.

Please send resumes to: C.C. Forsythe or call (316) 687-3308.

BCS BOEING COMPUTER SERVICES COMPANY
A Division of The Boeing Company

3801 South Oliver, Wichita, Kansas 67210
An Equal Opportunity Employer

PROGRAMMERS AND ANALYSTS

Free Employment Service
Northeast, Southeast & Midwest U.S.

Scientific and commercial applications • Software development and systems programming • Telecommunications • Control systems • Computer engineering • Computer marketing and support

Call or send resume or rough notes of objectives; salary, location restrictions, education and experience (including computers, models, operating systems and languages) to either one of our locations. Our client companies pay all of our fees.

RSVP SERVICES, Dept. C
Suite 700, One Cherry Hill Mall
Cherry Hill, New Jersey 08002
(609) 667-4488

RSVP SERVICES, Dept. C
Suite 300, Dublin Hall
1777 Walton Road
Blue Bell, Penna. 19422
(215) 629-0595

RSVP SERVICES
Employment Agency for Computer Professionals

INTERGLOBAL is...

a subsidiary of a NYSE listed company, with an EDP service bureau placing Consultants throughout the United States and foreign countries.

To take advantage of our nearby and worldwide EDP opportunities, please submit your resume for inclusion in our worldwide computerized retrieval system, to our corporate headquarters in New York City.

Ralph Young
INTERGLOBAL
TECHNICAL SERVICES, INC.
56 W. 35 St, NY,NY 10001
(212) 695-7773
Equal Opportunity Employer M/F

IBM
3033
AVAILABLE
Dec. '78
(914) 238-9631

DELIVERY POSITIONS AVAILABLE
IBM 370
138 & 148
January February March
Most Have 3203 Printers
Call Dick Murray at
RENAISSANCE
MARKETING INC.
(516) 271-2389

FOR SALE
CALCOMP GRAPHIC SYSTEM
925 CONTROLLER
1036 PLOTTER
CCC LEASING CORP.
946 Main St.
Hackenscak, N.J. 07601
(201) 343-3760

IMMEDIATE
DELIVERY
DEC LSI - 11
KD 11 - F
$755
Mini Computer Suppliers, Inc.
25 CHATHAM ROAD
SUMMIT, N.J. 07901
(201) 277-6150
Telex 13-6476

PROFESSIONAL DEALER/LESSOR OF IBM COMPUTER SYSTEMS
Bob Russell
Jack Emery
Dave Hepburn
Paul Baillie

SYSTEMS MARKETING INC
208 E. Thomas Road
Phoenix, Arizona 85012
(602) 264 5680 Telex 667 334

SMI

FOR SALE
DISC DRIVES
2 DEC RK06 14MB
Drives and
controller for PDP-11
6 mos. old.
CONTACT
EARL M. GOLDMAN
(415) 682-3144.

Want to Buy
3158 Memory
U35 - U36
3158 - J
compuduct
6115 28th St., S.E.
Grand Rapids, MI 49506
(616) 949-0281

WANTED

RANDOLPH NEEDS:
3340-A2 DISK
3420-3,4 & 8
MODEL TAPE DRIVES
CALL: MIKE SEEKINGS
TOLL FREE
800-243-5308

RANDOLPH COMPUTER COMPANY
Division of Firstbank Financial Corporation
A SUBSIDIARY OF THE FIRST NATIONAL BANK OF BOSTON
537 Steamboat Rd., Greenwich, CT 06830 • (203) 661-4200

WANT TO BUY

IBM 3271-2
IBM 3272-2

FOR SALE

024	084	419	552	*2402
026	085	514	557	*2403
029	088	519	602	*2405
056	089	521	604	*2406
077	402	523	824	7330
082	403	526	826	
083	407	548	867	

(* Potter)

Call Warner Rivera
at (212) 557-3712

GENESIS ONE
COMPUTER CORPORATION
an MAI company
300 East 44th St., New York, NY 10017

IBM UNIT RECORD EQUIPMENT

MACH	SALE	LEASE	MACH	SALE	LEASE	MACH	SALE	LEASE
024	$ 300	$20/Mo.	082	$ 850	$ 35/Mo.	407	$1800	$ 80/Mo.
026	$ 900	$35/Mo.	083	$1800	$ 60/Mo.	514	$ 800	$ 45/Mo.
029	$1800	$55/Mo.	084	$2500	$100/Mo.	519	$1000	$ 55/Mo.
046	$1200	$50/Mo.	085	$1200	$ 60/Mo	526	$1400	$ 70/Mo.
047	$1500	$60/Mo.	088	$2500	$175/Mo.	548	$1600	$ 60/Mo.
056	$ 250	$15/Mo.	129	$3400	$105/Mo.	552	$1000	$ 40/Mo.
059	$1400	$50/Mo.	402	$1200	$ 60/Mo.	557	$3000	$100/Mo.
077	$ 450	$25/Mo.	403	$1500	$ 70/Mo.			

THOMAS COMPUTER CORPORATION

600 N. McClurg Court - Suite 4202
Chicago, Illinois 60611
(312) 944-1401

115 Harbor Island Rd.
Newport Beach, CA 92660
(714) 675-2810

370/125's

For Sale* Lease* Purchase
****Purchase Leaseback***
Specialists in 125 Systems
3410's and 3411's Also Available
CORPORATE COMPUTERS, INC.
(203) 661-1500
115 Mason St., Greenwich, CT 06830
Member CDA

We are buying, selling, & leasing!

Buying: 3830, 3420
Selling: 360/65, 360/40
Leasing: 370/155, 360/65

Please contact:
Linda Vaughn / (415) 955-0220
Tommy Talbot / (415) 955-0238

ITEL CORPORATION

FOR LEASE
SHORT OR LONG TERM
2065-I-HO
2860-003
2870-001
3X2365-002
1052-007
AVAILABLE LATE JANUARY
SHORT OR LONG TERM LEASE
FOR ALL YOUR 360/370 COMPUTER REQUIREMENTS CALL
ALBERT BERMAN GEORGE SPRINGSTEEN
(215) 885-4990
GRANITE
COMPUTER LEASING CORP.
BENSON EAST
YORK ROAD AND TOWNSHIP LINE
JENKINTOWN PA 19046
MEMBER COMPUTER LESSORS ASSOCIATION

Distribution Management Systems, Inc.
DMS 330
ON LINE ORDER ENTRY
INVENTORY MANAGEMENT
ACCOUNTING SYSTEM

for
Large Scale Wholesalers
Light Manufacturers

Data Base System Permits total access by name, part number, generic group, family, relational, city, phone. [illegible] terminal DMS system is demonstrable, affordable — the most revolutionary cash flow machine available anywhere at any price.

■ Omaha, Nebraska 68124
■ (402) 391-8210

DEC
BROKER IN NEW
&
USED DEC COMPUTER
SYSTEMS
& COMPONENTS
C.O. SMITH
730 N. Post Oak Rd.
301
Houston, TX 77024
(713) 686-9405

BUY-SELL
TRADE
For Computer
Call Action Write
CAC
404/458-4425
P.O. Box 80572
Atlanta, Ga. 30366

FOR SALE

**DEC PDP 11/40
SYSTEM INCLUOING
RSTS/E SOFTWARE**

(4) RK05 Disk Orives and Controllar
(11) RK05-Typa Oisk Packs
(2) TU10 9TR/800BPI Magtape Orives and Controllar
256 K8 Parity Cora
Consola Taletypa/with intarface
Diva OO-30 Oisk Systam with controllar (Oiva emulatas and programs same as 2-RP03 Orives)

Entira systam under constant maintanance contract. Availabla early April, 1978 (upgrading to 11/70 systam).
Will separata, but graatar savings on antira systam.
Call or writa with yoer offar. Specifics on requast.

Bob Mercus
BLOCK ANO COMPANY, INC.
111 t S. Wheeling Road
Wheeling, IL 60090
(312) 537-7200

MINICOMPUTERS & SYSTEMS

Don't weste company time or money. Check with us before you buy or sell.

**New OEC Equipment
Immediete Delivary**

RK11-RK05 Oisk Systems - $6500
POP 11/04s and 11/34s - 20% off list
DZ 11
DEC Stetion 78

**New DG Equipment
Immediata Delivery**

OG 10 Mbyte Oisk Systems from $7500
DASHERS - 15% to 25% off list
Nova 3/12 or 3D - 20% off list

Immediete delivery for MOS!
Inventory Clearence
call us for free brochura

**MINICOMPUTER
EXCHANGE**
(408) 733-4400
TWX 910-339-9272

DEC HARDWARE

**PDP 11 POP 8
ProcessorsPeripherals
Memories**

VT52's, LA36's, LS120's, LA180's
BROOKVALE ASSOCIATES
Seekers and Sellers
(516) 585-0800

CONTINENTAL Information Systems

BUY, SELL, LEASE, SUBLEASE, ANO TRAOE

NEW AND PRE-OWNED IBM EQUIPMENT

WERE YOU A WINNER IN THE IBM LOTTERY?

IF NOT, CIS is having a supplementary drawing for winning alternatives to the 3031, 3032, and 3033. We can deliver the following IBM 370 equipment to meet your needs:

Jen. 78	155-DAT aveileble 165-DAT aveilable 158-New, ITC quelifying 168-New, ITC quelifying	Mer 78	158 158-New, ITC quelifying 168-New, ITC quelifying
Feb 78	158 158-New, ITC quelifying 165-DAT available 168-New, ITC qualifying	Apr 78	155-DAT aveilable 158-Naw, ITC quelifying 168-New, ITC quelifying

Several 370 systems available beyond April, 1978.

If you hold a winner in the IBM lottery, we will buy your currently installed IBM equipment from you.

Call Us!

CIS

CIS Corp.
600 MONY Plaza
Syracuae, NY 13202

315-425-1900

FOR SALE OR LEASE

(2) 3330-11
1-4 Years
Aveileble 2/15/78

(2)1403/2821
600 or 1100 LPM-UCS
Avellable 2/1-4/1/78

2501-B1/B2
Avallable 2/1 4/1/78

(3) 3420-3 Wanted

SYSCOMP
2150 Crestview Orive
Excelsior, MN 55331
(612) 474-8873

FOR SALE BY USER

CC-70 FRONT ENO COMPUTER COMMUNICATOR CONTROL SYSTEM

3 PDP-8I's with 8K
1 PDP-1 with 8K
10 Rixon DS-2401S Modems
3 Digitronix Peper Tepe Punch Converters w/Ampex Megnetic Tape Drive Readers
13 Magnetic Tepe Recks

Midwest Stock Exchange
120 S. La Salle St.
Chicago, IL 60601
Fred Siegman 312-368-2266

BUY – SELL–LEASE –BROKERAGE–

[illegible]

Buy sell, lease sub lease, or be your agent in placement of your pre owned IBM 360/370/System 3, or other units

COMPUTER INTERNAT'L LTD
BEACH COMPUTER CORP
CWC's Leasing Division
COMPUTER WHOLESALE CORP
(504) 581 7741

Suite 507/508 First National
Bank of Commerce Bldg
New Orleans LA 70112
[illegible]

BUYING SELLING LEASING

370/

135
138
145
148
155
158
165
168

214/630-6700
Pioneer Computer Marketing
1165 Empire Central Place Dallas, Texas 75247

IBM 370/3033 AN IMMEDIATE SOLUTION

Need more processing power now: CSA cen provide you with a 370/158, 165 or 168 now on e short or long term lease to bridge the gap to a 303X system which CSA can commit to you now.

If you ere elready renting e 370/158, 165 or 168 from IBM on a monthly basis, you can save money by instelling one from CSA under e short-term leese.

The following models are availeble on lease terms of one to five years with edditional upgrede provisions:

370/188	S/N	60030	Availabla	January 1978
370/165	S/N	60103	Availabla	April 1978
370/158-MP	S/N	23868	Availabla	January 1978
370/158-MP	S/N	23699	Availabla	February 1978
370/158	S/N	23769	Availabla	March 1978

Computer Systems of America, Inc.
141 Milk Street, Boston, MA 02109
Cell our toll-free line: (800) 225-2036
or (617) 482-4671

SALE

**ALL
IBM Unit Record
Equipment
129 & 029's**

East Coast
(717) 564-8870
West Coast
(415) 332-6265

dpa Unit Record
Leesing Compeny
110 HiVista Road
Seusallto, Calif.

LEASE

BUYING•SELLING•LEASING•TRADING

call... the Matchmakers

1·800·654·9179

TOLL FREE!

CSI COMPUTER SALES INTERNATIONAL, INC.

For Sale Or Lease
System 3/15
Complete Systems

Any configuration from B 19 to D 24
30 to 90 days delivery depending
upon your requirements.
Also complete inventory tapes — disks.
Printers — CPU Upgrades

Call Avery Reynolds 214-630-6700
TWX 910-861-4936

PCM
Pioneer Computer Marketing
1165 Empire Central
Dallas, Texas 75247

Member of Computer Dealers Association

IBM EQUIPMENT FOR SALE OR LEASE

2501/B2 Card Reader
2520/B2 Card Punch
2821/5 w/PFR
3330/3333 Model 1 & 11 Disks
3420/3 & 5 Tapes
3505/3525 Reader & Punch
3803/1 w/7 & 9 TR RPQ
3830/2 (w/Madrids)
370/125 HO w/IPA & Byte MPX

WANT TO BUY

3270 Display Equipment
3340/A2 & B2 w/Fixed Head & RPS
3420 Tape Drives — All Models
3780 RJE Terminal
3830/2 Disk Controller
370/145 Processor

Call

FORSYTHE McARTHUR
(312) 943-3770

Dealer &
Lessor In IBM
Computers

FORSYTHE/McARTHUR ASSOCIATES INC
919 North Michigan Ave Chicago IL 6061

Member Computer Dealers Association

WANTED TO BUY
IBM 370/155
with or without DAT
Contact: Harry Blair
(713) 524-8249

WAITING FOR A 3031 AND NEED AN INTERIM CPU?

TRY OUR
3155 WITH DAT
AND AMS PSU
ONE YEAR LEASE COST LESS
THAN IBM'S RATE ON A 3148
AT TWICE THE CPU POWER
2, 3, 4, & 5 YEAR LEASES AVAILABLE

TNCC

THOMAS NATIONWIDE COMPUTER CORPORATION

Brian M. Battle — (312) 944-1401
600 North McClurg Court-Suite 4202A
Chicago, Illinois 60611

Paul Nortman — (516) 752-1000
1 Huntington Quadrangle-Suite 4S13
Hungtington Station, New York 11746

IBM PROCESSORS & PERIPHERALS

	PROCESSORS	PERIPHERALS
SELLING:	3145H-Now 3155J02-Jan. 3165-2-Now	3420-6 w/6425 Avail. January
LEASING:	3165-4 MEG 7 Channels 3033-August	All 3420 Tape Drives
BUYING:	3158 3168	3420-4, 8 3333-1, 3330-11

The Logical Choice

COMDISCO
9701 W. Higgins Rd. Rosemont, Ill. 60018
(312) 698-3000

San Francisco
415/944-1111

Fort Worth
817/534-1774

Atlanta
404 256-5956

Minneapolis
612/854-8107

New York
201/568-9666

Paris, France
374-1130

BUY • SELL • LEASE • TRADE

SYSTEM/3 370/115
370/125

ECONOCOM

ECONOCOM
1255 LYNNFIELD ROAD
P. O. BOX 17825
MEMPHIS, TENNESSEE 38117
901-767-9130

MEMBER COMPUTER DEALERS ASSOCIATION

COMPUTERWORLD CLASSIFIEDS WORK!

Mini-Computers
BUY-SELL-TRADE-LEASE
FOR SALE

D.E.C. CPU'S

11/04-DC	$ 3,800.00
11/40-BK	$ 9,500.00
PDP-8E 8K	$ 3,800.00
11T34BA New & Used	$28,000.00

D.E.C. DISCS

RP04AA	$20,000.00
RP04 & Controller	$28,000.00
RP03	$11,000.00
RK05J	$ 3,500.00
RK11D & 2nd RK05J	$ 8,900.00

D.E.C. CRT'S

VT05	$ 1,100.00
VT50HA	$ 1,000.00

Hundreds of Miscellaneous Modules & Cables Available

CALL FOR OTHER COMPONENTS IN STOCK

DATALEASE

700 North Valley Street, Anaheim, CA 92801
(714) 533-3920 TELEX 692439

Sale or Lease

370/135 FEO
3330/3340 IFA
Available March 78
360/30 Model F
64K System
Lo Speed I/0

FOR LEASE

3033 8 Meg Syst.
Fall 78 Delivery

Call George Gilman
(212) 673-9300

IDA DATA CORP
383 Lafayette St.
New York, N.Y. 10003

FOR SALE

DEC 11 V03

DEC 11 V03
OR ASSUME MY LEASE
$258/mo. 8 mos. old
INCLUDES
1-11V03 w/Dual Floppies
1-VT52
1-24 K Intel Memory
2-DLV11's, Cables
1-LA38
RT-11, System
Documentation
Basic Fortran
Application Software:
G/L, A/P, A/R, P/R

CALL (205) 821-8230

WANTED FOR LEASE or Purchase 360/65 Model I or IH 3 Channel with 7074 Emulation

Reply to CW Box 1382
787 Washington St.
Newton, MA 02160

CMI BUY LINES

BUY-SELL-LEASE-TRADE

3031/3032/3033
(Lease Only)
John Mills
(313) 642-8000

370/165 370/168
Bob Van Hellemont
(313) 642-8000

370/158
Ron Baker
(313) 642-8000

370/155
Gary Smith
(313) 642-8000

370
148/145/138/135
Pam Hoban
(313) 642-8000

370/115/125
Bob Southwell
(313) 642-8000

3420 3803
3333 3830
3330 3340
Darryl Hastings
(313) 642-8000

IN CANADA
IBM 360 370
System / 3
Don DuPuis
CMI Company
P.O. Box 893
Windsor, Ont.
N9A 6P2
(519) 258-8910

1403 2821
2501 1442
1443

If you rent any of these and are returning them to IBM call me. I'll show you how to make money using your rental credits. We buy and sell all of these units.

Kathy Housey
(313) 642-8000

360
30/40/50/65
Gary Smith
(313) 642-8000

3270 CRT's
Printers/Controllers
Jim Carleton
(313) 642-8000
129-029-059-026

System/3
Model 15
Jerry Roberts
(313) 642-8000

3742
3741
5496
Jerry Sharon
(313) 642-8000

360/20
1130
Jim Carleton
(313) 642-8000

CMI CORPORATION *The IBM Specialists*
1500 N. Woodward Ave., Birmingham, Mich. 48011, (313) 642-8000

Member Computer Dealers Association

IBM 360-40 256K

9 Spindles 2314-1
For Immediate Lease
2 or 3 Years
Call
C. E. Roberts
317+448-2460

FOR SALE

WANG WCS-30 system, 24K, with 2 10-MB disk drives, plus: - 4 2200 T-4 processors (24K) multiplexed to disk drives - 2 2221-W printers (200 CPS) - 1 2270-1 floppy disk drive - 1 2227-B telecommunication controller

AVAILABLE IMMEDIATELY
CONTACT: Kern Parker
(304) 327-8164
W. VIRGINIA ARMATURE CO.
P.O. Box 1100
Bluefield, W. VA 24701

SERVICE BUREAU AVAILABLE FOR SALE OR MERGER

We are interested in selling to or merging with a TP oriented bureau, preferably, a 370 shop. Our batch oriented customer base has good TP potential.

Must be Los Angeles County location. Inquire in confidence to:

CW Box 1391
797 Washington St.
Newton, MA 02160

BUY-SELL-TRADE IBM EQUIPMENT

IBM 370 Memory-Buy & Sell

For Sale Now

370/135 Memory:	IBM FE to GF (96K to 192K)
370/135 Memory:	INTEL 96K to 320K
370/135 Memory:	AMS 192K to 320K
370/135 Memory:	AMS 240K to 384K
370/135 Memory:	AMS 256K to 384K
370/135 Memory:	INTEL - any 256K Increment
370/135 Memory:	AMS - any 512K increment
370/145 Memory:	INTEL - any 256K Increment
370/145 Memory:	AMS - any 512K Increment
370/158 Memory:	INTEL 1 Megabyte - For lease

CALL DICK BAKER (305) 561-5207

dataware incorporated
Intracoastal Building
3000 NE 30th Place, Suite 309
Fort Lauderdale, Florida 33306
Telephone (305) 561-5207

MEMBER CDA

For Sale

Norend Electronic Ordering NT50 Scanners. Excellent Condition. Reasonable Price.

Contact
Mr. Donald Vernon
Associates Grocers
of Colorado, Inc.
5151 Bannock St.
Denver, CO 80217
(303) 534-1155

1976 G.A. DM 130/2 with 64KB Core, 2 CRTs with 1920 character display, a 165 CPS printer and a 10 MB Disk Drive - $23,000.00.

Inquiries:

Mike Oakes
3100 Richmond
Suite 400
Houston, TX 77098
(713) 524-1871

PDP-11

Available for immediate delivery:
DS357
11/34 64K, 2-RK06, LA180
1-VT52 CTS300
11T34-AA
11/34 64K, LA36, 2-RK05s, RSX11-M
11/03-KA
PDP11/03 16K with Power Supply
MM11-DP 16K Core
PR11 High Speed Paper Tape Reader
DU11-DA Synch. Interface
KD11-P LSI 11 Board

Minicomputer Sales Corp.
14 W. 40th St.
New York, N.Y. 10018
(212) 221-7270

JAN GEDDES
sale of the week

DIABLO

Disk drives & systems

Diablo 31 2.5 Mb removable-cartridge disk drive, 1562 data transfer rate	$1,950
Diablo 33F 2.5 Mb fixed door disk drive, 1562 data transfer rate	1,250
Diablo 31 & 33F	2,900
Diablo 31 with System Industries 3010 Controller for PDP11, power supply & cable	3,495
Diablo 31 & 33F with System Industries 3010 controller for PDP11, power supply & cable	4,495
Diablo 31 with Decision 3170 Controller for Data General, power supply & cable	3,900
Diablo 31 & 33F with Decision 3170 Controller for Data General, power supply & cable	4,900

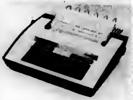
ONE-DAY SHIPMENT A.R.O. WHILE SUPPLIES LAST

90 day warranty
Call to Reserve

NEWMAN COMPUTER EXCHANGE
(313) 994-3200

TI'S MODEL 745 PORTABLE

TELETYPE MODEL 43 KSR



- Purchase and Lease Plans
- Nationwide Factory Service

Tele-Data
DATA COMMUNICATIONS EQUIPMENT
TELE-DATA INC.

Call Toll Free 800-327-3570
Contact
Ray Kreger

7800 Red Road. South Miami, Florida 33143
Telephone (305) 665-1611. Telex 515506 TWX 810-848-8021

COMPUTER FLOORS

BUYING
SELLING
INSTALLING

All Kinds of Computer
Floors for Efficient Service

Nord Computer
Floor Corp.

3 Warehouse Lane
Elmsford, NY 10523
(914) 592-2450-2451
(203) 248-7942

SELLING

PREVIOUSLY OWNED EQUIPMENT & SYSTEMS

N.C.R. & BURROUGHS

N.C.R. 31, 32 & 151 & 152 Teller Units
735/735 & 745 Mag. Tape Enc. & Line Printers
N.C.R. 299, 399 & 499 MINICOMPUTERS and CENTURY SYSTEMS
BURROUGHS "L" 3000 THRU 9000 SERIES & TC'S
Also B-700 Thru B-4700 Systems w/wo Peripherals
WE ARE AUTHORIZED N.C.R. DEALERS OF
210 ECR'S, SYSTEMEDIA, & MICROGRAPHIC PRODUCTS

BUYING OR SELLING-CALL US FIRST.

KEY-EXIMPORT CORP.
256 LIVINGSTON ST. (P.O. BOX 129) NORTHVALE N.J. 07647
TELE. N.J. (201) 767 3444 N.Y.C. (212) 736 7736
TELEX 135149 , CABLE KEYEXIMP NORTHVALE NJ

BUYING

IPS

201-947-4200

IBM RENTAL CREDITS

We will pay for your rental credits on FTP, ETP, and MAC machines. Call us before sending your machines back to IBM.

FOR LEASE

145 I0

available immediately on long or short term lease

FOR SALE

165K II

DATed, up to 4 megabyte For Sale or Lease

155J

available now with or without new DAT

14512

available now with ISC

3420-3, 5&7

available now with controllers

158 ISC

available now

I/0 Sets

all combinations avail. for sale or lease

360/50I

Priced to move now

PURCHASE/ LEASEBACK

370/125 Systems Save rent starting today Call for a quote

WANT TO BUY

370/168, 165, 158, 155's
IBM Tape Systems
and Disk Systems
All 370 Memories

IPS Computer Marketing Corp., 2460 Lemoine Avenue, Fort Lee, N.J. 07024

BUY-SELL-SWAP

PDP 11'S & NOVA'S

Systems and Peripherals at very attractive prices

New and Used

ICS

Computer Equipment Sales

408-735 7360 PAUL PEREZ 408 735 7361

---

dc

dearborn giveth:
370's: 370-145J (mod 2 & ISC avail.);
3420-7 single.

dearborn taketh:
370-145's; 370-135's; 3420's; 3330's; 3340's.

Call Tom Millunchick: 312/827-9200
or any dearborn office.

(for 360 equipment, call Ed Winclechter:
312/827-9200 or any dearborn office.)

dc dearborn computer company
dealer-IBM computers
systems software
leasing

1460 renaissance dr., park ridge, ill. 60068 (chicago) 312/827-9200
toronto (416) 621-7060 • st louis (314) 727-7277 • houston (713) 965-0788

---

digital

Factory Refurbished Equipment

All quality tested and warranteed by the people who made them.

- Complete systems
- Processors
- Peripherals
- Accessories
- Complete Documentation

Digital Equipment Corporation
Traditional Products
125 Northeastern Boulevard
Nashua, New Hampshire 03060

☐ Please send your complete product listing.
☐ Please call, I'm specifically interested in:______________

Name______________
Address______________
City______________
State______________ZIP______________
Phone______________

CW1168

BUY SELL LEASE

370, 360, 1401 & 1440
SYSTEMS & PERIPHERALS

PURCHASE/LEASEBACK

029, 129, 3741, 3742, 3540, 3803, 3420, 3340's

IBM UNIT RECORD EQUIPMENT

026, 082, 083, 084, 085, 087, 088, 402, 407, 514, 519, 548, 552, 557,
029-059-129

Call us for all your needs; we buy rent and sell all types of IBM unit record equipment. Over 12 years of serving commercial and government requirements. Contact ACS for proposal.

ACS
7126 Mullins
Houston TX 77081
(713) 666-2122
TWX 910-881-1526

EQUIPMENT CORP.

ISI

INDEPENDENT

WE BUY-SELL-INSTALL & REPAIR
AT REASONABLE PRICES

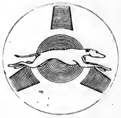
HONEYWELL USED SERIES 200 EQUIPMENT
COMPUTER SYSTEMS
PARTS — PERIPHERALS

Now In stock
2040-64K M7-32K M9
120-1250 — TAPE DRIVES
READERS. PRINTERS. PUNCHES
3200-131K Avail. 6/78

CALL NOW
Wilson Grabill (513) 874-8100

INTEGRITY SYSTEMS, INC

4812 Interstate Drive
Cincinnati, Ohio 45246



GO GREYHOUND

When you plan to Buy or Sell your Computer Equipment

For complete information call the Greyhound Representative in your area.

FOR SALE
3145-HO
360/65J

WANT TO BUY
3340-A2 & 3340-B2
3135 w/4655, 6981, 6982, 7855, 7861

U.S.	Home Office	T.A. Tekash	602-248-6037
	New York	Dick Ventole	914-949-1516
	Chicago	Pete Ahern	312-298-3910
	Dallas	M.W. "Bill" Tucker	214-233-1818
	San Francisco	Henry Paulson	415-283-8980
INTERNATIONAL	Canada	Don Maunder	416-366-1513
	U.K./Europe	Joe Gold	022-61-27-54
	Mexico	Andres' Contreras	905-543-6850
	Austro-Asia	John Hallmark	214-233-1818
	Eurasia	Don Haworth	214-233-1818
NON IBM	Dallas	John Hallmark	214-233-1818

WANTED

BURROUGHS 'L' Series
DEC & DATA GENERAL
Minis & Peripherals
NCR: 399 & 299

Boynton Business Systems
87 Route 208
Wellkill, N.Y. 12584
914-895-2007

Short or Long Term Leases From

RANDOLPH

370/138
370/148
370/135
370/145

...and all other 370's from 115's ... to 168's. CPU's or full systems. Up to 8-year lease available.

CALL THE 370 HOTLINE

800-243-5307

WANTED:
3420 Tapes: MOD 3's, 5's, 7's
135/145 Subleases or purchase

800-243-5308

Randolph Computer Company
537 Steamboat Rd., Greenwich, CT 06830
(203) 661-4200

370/165
For
Sale or Lease

- Will Configure to your needs
- Immediately Available
- DAT Available
- Short-term or interim lease available to 30XX System

Call or Write
George Forsythe

ALANTHUS CORPORATION
111 High Ridge Road
Stamford, Connecticut 06905
203 348-4820

FOR LEASE · SHORT OR LONG TERM

Equipment	Serial Number
158/KJ CPU	23766
145/JI2	10777
145/GFD	10868
138/J	20021
135/GF	81480
135/I	81154
125H2 (Canada)	10887

Othar Modals Available

IBM MEMORY
Various Modules of 158, 145 and 135 Memory Available

FOR LEASE OR SALE

3811/1	13046	2870/1	71038
3411/1, 3221, 7360	40026	2880/2, 1882, 7650	80458
3340/A2	21895	2821/2, 3815 (2)	22907; 12031
3330/1	11028	2385/2	41285
3211/1	11280	1403/N1 (2)	43182; 61882
3210/1	20540	1442/7	71755
3210/2	10823	1131/2B	12574

CDC 3300 Systam 77
Bunker Ramo 22285 Comm Ctl. Unit
(3) 31001002; 31001015; 31001030

WANTED TO BUY OR TRADE
An IBM 370 CPU or Peripharals
Call Marv Berger (800) 225-2036

Computer Systems of America, Inc.
Computer Systems of Amarica
141 Milk St., Boston, MA 02106
(617) 482-4670

BEFORE YOU BUY, SELL, OR LEASE, TAKE A 'SECOND' LOOK!

FOR SALE
3505-B1 and 3525 P3
3135-GF -- Fully Loaded
3155-J with Dat Box

WANT TO BUY
370/145 IBM Mem. I2-J2
370/135 IBM Mem. GF-H
3-1403 N 1
1442 N 1
3420-5 Single Density

COMPUTER INDUSTRIES INC.
3570 American Drive • Atlanta, Georgia 30366
404/451-1895 • TWX 810/757-3654

CHICAGO — 312 298 5650
WASHINGTON — 703/525 3074
LOS ANGELES — 213/370-4844

FOR SALE
IBM Sys 3

5415-021	Ser. # 40979
3277-001	Ser. # 30840
5421-001	Ser. # 12512
1403-N1	*
3340-A2	*
3411 optional	*

Avail Feb. 15-78
* Will be furnished at closing of contract

DATA AUTOMATION COMPANY, INC.
■ 4856 CASH ROAD ■ DALLAS, TEXAS 75247
■ AC 214 637-6870

SALE OR LEASE
1130-2D CPU
1133 Model 1
1403 Model 2
1442 Model 7

METROPLEX COMPUTER COMPANY, INC.
Suite 1208 Honeywell Bldg.
1111 W Mockingbird Lane
Dallas, Texas 75247 TWX 910-861-4171
(214) 634-2750

For Sale
XEROX DISK SYSTEM MODEL 7275
Controller
W/86 MB Disks
Call
Telefile
(714) 557-6660
Ask for
Mrs. Weddle

Wanted for Purchase or Lease Spring, 1978

370/158
Memory Only
2 Megabytes above Model K
Call Collect
DPF INC.
141 Central Park Ave. South
Hartsdale, N.Y. 10530
Attn: Norman Usher
(914) 428-5000

WANTED
029-129
3741-3742
We Buy
Rental Credit Machines
Continue to Rent at A
Discount From IBM Prices.

Call: Stewart Krakover

Data Rentals/Sales
(213) 559-3822

BASIC FOUR
MODEL 500

2 Disc Drives 4.2 megabyte each, Total of 8.4 40K of User Memory. Medium speed Matrix Printer.

Will sell as package or separate. Approximately 25 additional Disk Packs available. Will sell or swap for Model 600 plus cash.

Call Bruce Sears
(312) 276-8000

For Sale

(2) 3803-1
(10) 3420-5
360/30 F
128K 2030 Memory

compuduct
8116 26th St., S.E.
Grand Rapids, MI 49506
(616) 949-0281

Wanted To Buy
3672-Memorex storage control unit
3673-Memorex disc controller
3670-Memorex disc module
3675-Memorex disc module
Contact:
Harry Blair 713-524-1401

---

12 Month Lease
On Your Owned or Leased
370/158-168
(Term & Rate based on acquisition cost)

COMPUTER CAPITAL CORP.
1351 Washington Boulevard
Stamford, Connecticut 06902
Tel 203 357 9663

---

dataserv
buy • sell • lease • trade

370
115 and 125
Steve Lacny
800-328-2406

For Sale or Lease
Any 115/125 configuration

Sending 115/125 Back to IBM

Call us! We'll show you how to make money using your rental credits.

370
135 through 168
Dave Miller
616-637-8481

For Sale or Lease
135 · 145 · 155
CPUs — Peripherals — Memory
AVAIL. IN JAN.
370/138 MEMORY
I-J
3344-B2

370
Peripherals
800-328-2406

For Sale or Lease

3211/3811	3340/A2,B2
3272/3277	3410/3411
3330/3333	3420/3803

STOP! Before you send any of the above machines back to IBM call us. We'll show you how to make money.

360
CPUs and Peripherals
Neal Johnson
800-328-2406

For Sale or Lease
360/30 · 40 · 50 · 65s
CPU — Peripherals — Memory

1419 Single or Dual Address

We'll Buy
Any 360 CPU
IBM Peripheral
Non-IBM Perph/Memory

Sys/3
CPUs and Peripherals
800-328-2406

For Sale or Lease
5406 · 5410 · 5412 · 5415
CPUs — Peripherals — Memory

We'll Buy
Your 5406/5410
5415 — Rental credit machines
Peripherals — Memory

Call Toll Free 800-328-2406
or 612-544-0335
Or write: Dataserv Equipment, Inc., 9901 Wayzata Blvd.
P.O. Box 9488, Minneapolis MN 55440

Rent-Sell-Buy
Immediate Delivery

- Texas Instruments 733-745-810
- DEC Writer II-III
- Teletype Model 43
- IBM Punch Card Equipment

Call Collect: Stewart Krakover or Barry Thompson

Data Rentals/Sales Inc.

8611 Hayden Pl, (213) 559-3822 Culver City, CA 90230

WANTED

FOR PURCHASE OR LEASE

EARLY 1978

(3) 158 MEMORY ONLY

2 Megabytes above MODEL K

NORM USHER

DPF INC.

141 CENTRAL PARK AVE SO

HARTSDALE NY 10530

(914) 428-5000

For Immediate Lease or Sale

138's, 148's,
3203-4's
3033 (11/78)

(Lease Only)

BARRETT
CAPITAL
& LEASING
CORPORATION
14 Redwood Road
White Plains, N.Y. 10605
(914) 761-0070

WANTED

ALL 360/370 SYSTEMS AND SYSTEM/3
AND PERIPHERALS
WE BUY • SELL • LEASE • TRADE

transdata

Member Computer Dealers Association

P.O. Box 47762 Dallas, Texas 75247 PHONE (214) 631-5647

BUY SELL

Surplus DEC And Data General Hardware

For Sale

PHIL THOMAS (305) 272-8753

Thomas Business Systems, Inc.

Sale or Lease

2) 370/145-12

Serial # 10515 and 11192
Available 2/1/78
Combination 3145 inferum to 3031 lease
Plans also available.
Contact Jim Jamieson

(804) 643-9123

CCA

Commonwealth Computer Advisors, Inc.
707 East Main St. Suite 1650
Richmond, Virginia 23219
(804) 643-4200

AUCTION

Jan. 27, 1978, 2 p.m. p.s.t. 1205 Prospect St., Ste. 435, La Jolla, CA.

Computer System, formerly used as Taxicab dispatch, incl. 2 Data General Nova 2/10 32K Memory, w/accessories, 2 SAI 8-Chan. I/O boards, 4 PERTEC Mod. D3331 Disk Drives, 2 PERTEC Disk Formatter Controllers, 1 Centronix Mod. 101AL Line Printer, 1 Teletype Mod. 33ASR, Teletyp., 14 Hazeltine 2000C Video Display Stations w/Keybds., 2 IT Mod. 601 Garage Terminals, 1 Teledynamics Modem for phone line & Coupler, 1 SAI 100S Switch Module & Control Panel, 1 SAI 200S Keybd. Serializer & misc. equip.

For further info.
Contact: W. Williams
Science Applications, Inc.
1200 Prospect St.
Box 2351
La Jolla, CA 92038
(714) 459-0211

---

*WE BUY
AND SELL
AND INSTALL*

NEW AND USED COMPUTER ROOM FLOORING

Raised Floor Installation, Inc.
19 Sebago St.
Clifton, N.J. 07013
Tele. (201) 778-2444 in New Jersey
(212) 594 4039 in New York
(415) 546-9466 in Calif.

SMI FOR LEASE

3032 (4 MEG)

JUNE 78

CONTACT:
BOB RUSSELL

SYSTEMS MARKETING, INC
200 E. Thomas Road
Phoenix, AZ 85012
(602) 264 5600 TLX 667-334

ORDER POSITION AVAILABLE
IBM 370/138

AVAILABLE MARCH 1978

ITC ELIGIBLE

For Futher Information Contact
WESLEY ASSOCIATES
(201) 488-3400 Ext. 47

SOFTWARE WANTED

MCC

SALE
or short or long-term
LEASE

IBM 3271s, 3272s, 3277s

write or call

METROPLEX COMPUTER COMPANY, INC.
Suite 1208 Honeywell Bldg
1111 W Mockingbird Lane
Dallas, Texas 75247 TWX 910-861-4171
(214) 634-2750

BUY • SELL

TELETYPE

MODELS

43 • 33 • 32

NATIONAL
TELETYPEWRITER CORP.
207 Newtown Rd.
Plainview, N.Y. 11803
(516) 293-0444

FOR SALE OR LEASE

MACHINE/MODEL	DESCRIPTION	AVAIL.
3138	I (New) Del. Pos.	2/17/78
1403	2	2/1/78
2501	B2	1/15/78
3410	3 w/DD Tape Drive	2/1/78
64-128K	360/30 Indep Memory	Now
2030	64K Loaded CPU	Now

CALL KENNSCO 612-533-5800

Member Computer Dealers Association

SUPEREPORTER!

Our fast, inexpensive, easy to use, COBOL package can provide nearly unlimited reports. Users design their reports based on selection criteria, content and sequence! Send today for information.

ANALYSISTENCE
P.O. Box 11115
Newington, CT.
06111

---

efm computer
leasing, inc.

3000 marcus avenue
lake success, ny 11040
(516) 488-7676

LEASE • BUY • SELL

360/370 CPUs & PERIF.

ATTRACTIVE LEASES ON

360/40 360/65
360/50 370/135

FOR SALE
by owner
370/135

256K, 2 channels
with 3046 and 3215
available
February 1978
CW Box 1382
797 Washington St.
Newton, MA. 02160

BUY-SELL-LEASE

026-$ 850 085-$ 750
029- 1850 514- 800
082- 650 552- 750
083- 1600 557- 2500
Mohawk-6401-6403
NCR-736
Shredders
Bursters & Decollators
Call Stan Palc, Natalia Rayes

DP SERVICE Inc.

Phone (312) 774-2556 5505 N. Menard Avenue, Chicago, Illinois 60630.

ACCOUNTS PAYABLE SYSTEM

Many design features including:

- Auto. discount calculation
- Cost center reporting
- G/L interface tape
- Check reconciliation
- Written in COBOL
- Single data base
- Complete documentation
- 3 year warranty
- Batch mini or main frame

Low purchase price or rent.
Write or call for more information

LEGLER SYSTEMS COMPANY
23 Charles Hill Road
Orinda, CA 94563
(Est. 1972) (415) 254-1264

BUY·SELL·TRADE IBM EQUIPMENT

360/65 or 65 MP CORE
1.5 Megabytes For Sale

Independent memory in single cabinet. Great savings on floor space, power, air conditioning and maintenance. 5th port available. Priced right. Intermem.

CALL DICK BAKER (305) 561-5207

dataware incorporated
Intracoastal Building
3000 NE 30th Place Suite 309
Fort Lauderdale, Florida 33306
Telephone (305) 561-5207

MEMBER CDA

FOR SALE OR LEASE

Immediately Available

IBM 3330/001's
IBM 3330/011's
IBM 3333/011's
with features #8150

Contact: Harry Blair 713-524-8249

PRINTING FIRMS

Software for Computer Estimating, Production Planning and Order Entry. Installation and training assistance available. RPG II, Fortran IV.

Green Systems, Inc.
Box 25402
Charlotte,NC 28212
(704)568-0976

PAYRDLL PERSONNEL

SUPER/PAY ONLY $960 ANS COBOL 60+ USERS

Users on IBM, Burroughs, Univac and minis such as NCR, DG, & Four Phase

Easy to Use 30 Day Trial

Occidentel Comouter Systems
10202 Riverside Drive
No. Hollywood, Calif. 91602
(213) 783-5144

ACCOUNTING SOFTWARE FOR DEC RSTS/E CTS-500 USERS

From one of the oloneers in commercial data processing using RSTS. Successtul installetions in manutecturing, distribution, service bureeu uses. Comoletely on-line, interactive systems. It you are installing or have installed a RSTS/E or CTS-500 system, contact us tirst tor cost-ettective solutions in: ACCOUNTS PAYABLE; GENERAL LEDGER; FINANCIAL REPORTING

The design specifications for these oackeges were developed by accountants for use by eccountents. All packages orovide excellent audit-trell, extensive user prompting, fast data entry, full tile-meintenance and inquiry ceoabilities, modular design and construction.
These ere consolidating packages and suoport multi-division company and multi-comoany corporate accounting tunctions.
For more information, contact us at:

I219) 936-2183
p.o. Box 160
plymouth, in 46563
Olv. of Young Door Co.

Plycomtm services

TONE 3

The only

TSO for VS1

Redesigned to eliminate TCAM and the staggering overhead of user swapping

ISP

(Intersystem Spool Processor)

System-to System Communication for VS1

(Write or phone for details)

TONE
Software Corp.

(714) 636 8501
11588 Tresk Avenue
Garden Grove, Ca 92643

SAVE

RPG/RPG II TO COBOL TRANSLATOR

This packege accepts all typas of RPG and produces ANS COBOL while approaching 100% error free conversion. Tha resulting COBOL progrem is modular in design end easy to reed and meintein. Severel client service options ara aveileble: Perpetual Lease, Conversion only, Clean Compile end full implementetion including production JCL, test end installetion. Over 100 satisfied customers.

For Prompt Reply Write or Call Us Today

DASD Corporation

Park Ridge, Illinois 60068, Suite 315
1480 Renaissance Dr., (312) 299-5005

RPG II SYSTEMS

- *A/R-OPEN ITEM OR B/F
- *ACCOUNTS PAYABLE
- *GENERAL LEDGER
- *PAYRDLL AND LABOR DIST.
- *INVENTORY
- *CREDIT UNIDN' MAILING, ETC

Extensive Documentation Provided

Bancroft Computer Systems
P.O. Box 1533, Dept. C
West Monroe, LA. 71291
I318) 388-2236

RPG TO COBOL

Datawara's software translator converts RPG and RPG II programs to tha industry standard ANS COBOL (DOS or OS). The trenslator echieves en extramely high parcantage ol eutomatic conversion (epproaching 100%) of the source code.

- RPG/RPG II to PL/1
- PL/1 to COBOL
- EASYCODER/TRAN to COBOL
- BAL/ALC to COBOL
- AUTOCODER (7070) to COBOL
- COBOL to COBOL
- AUTOCODER/SPS to COBOL

For more information on our translators, write or call today

Dataware, Inc.
495 Delawara Street
Tonawanda, N.Y. 14150
(716) 695-1412

RSTS/E

Communications

The HASPBOX(tm) is a communications front-end processor for DEC RSTS/E

- 360/370 communications via HASP protocol
- Block compression (increasing lina throughput up to 35%)
- Supports lina speeds up to 19.2 KB
- Automatic input queuins facility
- Allows remote RSTS printars and card readars
- Supports RSTS to RSTS systams communication

Contact
Software Results Corporetion
455 West Seventh Ave.
Columbus, Ohio 43201
(614) 421-2094

DIGITAL PDP-11 DATASYSTEMS

Applications Software

- Accounts Receivable
- Accounts Peyeble
- General Ledger
- Payroll/Personnel
- Order Processing
- Inventory Control
- Word Processing

Timesharing Dataservices

- Dual PDP-11/70's
- National Network
- Applications Softwere
- RSTS/E System Utilities
- Distributed Deta systems
- Softwere Development
- Consulting Services

ims

Interactive Menagement Systems, Inc.
375 Concord Avenue
Belmont, Mess. 02178 (617) 489-3550

General Data Systems

- Systems Design
- Software Development
- De-Bugging
- Model-Analysis

For Applications Within the Following:

- Medical Systems
- Town & Govenment Systems
- Business & Financiel Systems

Call

GDS
(617) 545-1872
11 Sedgewick Drive
Sciluate, MA 02060

PROC/ANALYSIS

Is an O/S system utility that provides cross-reference information on JOB STEPS, PROGRAMS EXECUTED, DATA SETS, & SYSOUT FORMS within a particular PROCLIB, a combination of PROCLIBS, a specific number of PROCS or all PROCS having identical GENERIC NAMES.

A perfect tool to anforce standards in nsming conventions, identify use of certain FORMS, syntax check PROCS and provida information on where PROGRAMS end DATA SETS ara used, PROC/ANALYSIS is available from CHICAGO DATA SYSTEMS, INC. an a 30-day free trial.

Full prica of $2500 includes SOURCE CODE, SAMPLE JCL, COMPLETE DOCUMENTATION including SAMPLE REPORTS, and a ONE YEAR WARRANTY.

INTERESTED? Call or write: JOHN A. AMBLER, President, CHICAGO DATA SYSTEMS, INC., P.O. Box 7844, CHICAGO IL 60680. Phone (312) 751-5474.

TIME & SERVICES

Datacenter 370/158

3 meg VS2
Specializing in
Remote Job Entry
and Batch
Excellant Technical Support
Very Attractive Rates
Contact: Stu Karievsky
(212) 564-3030
Datamor
132 W. 31st St.
New York, N.Y. 10001

WE ARE

BROKERS OF COMPUTER TIME

New York & New Jersey Only!

Computer Reserves, Inc.
(212) 887-1840
(201) 870-1081

NATIONAL DATA SYSTEMS, INC.

RSX-11M
Systams Design
Consulting/Programming
APPLICATIONS:

- Online
- Teleprocessing
- Point of Sala
- Businass
- Scientific
- Real Time

TurnKey Systems Installed
Call Roy S. Nicolosi
(201) 843-5300

COMPUTER TIME

- ALL SHIFTS AVAILABLE
- DOS/VS AND GRASP ENVIRONMENT
- COMPLETE DATA PROCESSING SERVICES PROVIDED
- REASONABLE RATES

370/145-256K

PERIPHERAL DEVICES INCLUDE:

(8) 2314 DISK DRIVES
(6) 200/400 KB DUAL DENSITY 9 TRACK TAPE DRIVES
(2) 1403 N1 1100 LPM PRINTERS
(1) 1442 CARD PUNCH
(1) 2501 CARD READER
(1) 2671 PAPER TAPE READER
(1) 3215 CONSOLE PRINTER

CONTACT JIM GREEN OR LARRY YOUNG
MASS. TEL. (617) 583-6000

I.B.M. 360-40

All Shifts 128K, 4-2401 MOD-2, 9-2314, 1403-N1, 2540, 1401 Compatibility.

From $35/Hour

Restaurant Associates, Inc.
1540 Broadway
New York, N.Y. 10036

Contact:
Al Palmo (212) 974-4966
Charles Laigey (212) 974-4967

CORE MEMORY REPAIR

Ampex, Burroughs, CAI, CMI, Date Craft, Data General, CDC, DEC, EMM, Fabri Tek, Honeywell, GAI, HP, Interdate, Lockheed, Plessey, NCR, SMI, Univac, Microdata, Varian, XDS.

Any Manufacturer's Memory

THREE DELTA CORP.
1038 Kiel Ct.
Sunnyvale, CA 94086
(408) 734-2680

CHICAGO 370 - 145

DOS/VS - GRASP
TIME/SERVICE
Computyme of Chicago
(Loop)
(312) 922-6624

RJE SERVICES

370/165-2

Systems Engineering Computer Co.

announces the availability of:

CHICAGO DATA CENTER
With Nationwide Network

Contact: Robert Chomko
(312) 298-0997

SEC SYSTEMS ENGINEERING COMPUTER CO.

2500 East Devon Ave.
Des Plaines, IL 60018

TEXT DATA BASE BUILDING

Fantastic Rates!
Fantastic Service!

ComCom inputs fifty million characters per week with e maximum error rate of one in 20,000 characters—double-keyed and electronically proofread.

Rates begin et $1.25/M characters.

Specialty—converting, updating and CRT typesetting existing data bases.

Interested? Contact
Mr. David Zellner
ComCom, Inc.
834 N. 12th St.–Box 2
Allentown, Pa. 18102
215–437–9656

REMOTE JOB ENTRY

PHOENIX-HECHT

- IBM 370/158-3
- Nationwide Incoming Watts lines
- Complete systems and softwars support
- Full spplication Library (including sll sccounting spplications)
- All high-level languages
- Prime time snd off hours
- VS 2, HASP, INTERCOMM, ROSCOE
- Complete dats security including off-site storsge

For information
call Walter Czerniek
at (312) 861-7100

PHOENIX-HECHT
233 N Michigan Avanue
Chicago, Illinois 60601

COMPUTER TIME

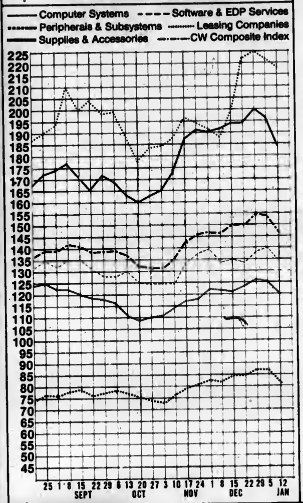
RJE - Standalone - Batch
FULLY CONFIGURED
370/158 & 155II
360/30

- COM-OMR FACILITIES
- EXCELLENT RATES
- CONVENIENT CENTRAL JERSEY LOCATION

Call Collect
Larry Muth (201) 524-2083

ICOTECH
P.O. Box 67
Route 202
Reritan, N.J. 08869

COMPUTERWORLD
Computer Stocks Trading Indexes



Earnings Reports

ANALOGIC
Three Months Ended Oct. 1

	1977	1976
Shr Ernd	$.41	a$.17
Revenue	5,753,955	3,069,753
Earnings	495,813	197,078

a-Restated to reflect a two-for-one common stock split.

BEEHIVE INTERNATIONAL
Year Ended Sept. 30

	1977	1976
Shr Ernd	$.82	$.81
Revenue	20,473,934	12,877,993
Earnings	653,277	763,710

ENNIS BUSINESS FORMS
Three Months Ended Nov. 30

	1977	1976
Shr Ernd	$.43	$.23
Revenue	18,357,278	16,283,871
Earnings	904,164	523,238
9 Mo Shr	1.00	.73
Revenue	47,544,878	46,816,930
Earnings	2,744,490	1,831,445

GENERAL AUTOMATION
Three Months Ended Oct. 29

	1977	1976
Shr Ernd	$.07	$.32
Revenue	18,861,000	20,926,000
Tax Cred	40,000	118,000
Earnings	182,000	795,000

INCOTERM
Three Months Ended Nov. 26

	1977	1976
Shr Ernd	$.30	$.34
Revenue	10,923,000	8,940,000
Earnings	475,000	682,000
9 Mo Shr	.82	.80
Revenue	33,985,000	27,058,000
Earnings	1,667,000	1,594,000

NATIONAL DATA
Three Months Ended Nov. 30

	1977	1976
Shr Ernd	$.17	$.12
Revenue	8,655,000	a7,244,000
Earnings	754,000	547,000
6 Mo Shr	.33	.23
Revenue	17,330,000	a14,556,000
Earnings	1,465,000	1,052,000

a-Restated.

Computerworld Sales Offices

Vice-President/Marketing
Roy Einreinhofer
Advertising Administrator
Terry Williams
COMPUTERWORLD
797 Washington Street
Newton, Mass. 02160
Phone: (617) 965-5800
Telex: USA-92-2529

Boston
Robert Ziegel
Northern Regional Manager
Mike Burman
Account Manager
COMPUTERWORLD
797 Washington Street
Newton, Mass. 02160
Phone: (617) 965-5800

New York
Donald E. Fagan
Eastern Regional Manager
Frank Gallo
Account Manager
COMPUTERWORLD
2125 Center Avenue
Fort Lee, N.J. 07024
Phone: (201) 461-2575

San Francisco
Bill Healey
Western Regional Manager
Jim Richardson
Account Manager
Donna Dezelan
Account Coordinator
COMPUTERWORLD
1212 Hearst Building
San Francisco, Calif. 94103
Phone: (415) 495-0990

Los Angeles
Bill Healey
Western Regional Manager
Jim Richardson
Account Manager
Judy Milford
Account Coordinator
COMPUTERWORLD
1434 Westwood Boulevard
Los Angeles, Calif. 90024
Phone: (213) 475-8486

Japan
Mr. Shigema Takahashi
General Manager
DEMPA/COMPUTERWORLD
1-11-15 Higashi Gotanda
Shinagawa-ku, Tokyo 141
Japan
Phone: (03) 445-6101
Telex: J2424461

United Kingdom
Tony Vickers
IDG PUBLISHING LTD.
140-146 Camden Street
London NW1 9PF
England
Phone: (01) 267-1201
Telex: UK-264737

West Germany
Hans-Jurgen Ballnath
COMPUTERWORLD GmbH
8000 Munich 40
Tristanstrasse 11
West Germany
Phone: (089) 36-40-36
Telex: W.Ger-5-215250-HKFD

Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, JANUARY 11, 1978

All statistics compiled, computed and formatted by
TRADE QUOTES, INC.
Cambridge, Mass. 02139

COMPUTER SYSTEMS

EXCH		1977-78 RANGE (1)	CLOSE JAN 11 1978	WEEK NET CHNGE	WEEK PCT CHNGE
A	AMDAHL CORP	22- 55	46 5/8	-5 1/8	-9.9
N	BURROUGHS CORP	55- 91	66 5/8	-5 5/8	-7.4
O	COMPUTER AUTOMATION	18- 30	23 1/4	-5 3/4	-15.8
N	CONTROL DATA CORP	20- 29	25 1/2	-2 3/8	-8.5
O	CRAY RESEARCH INC	13- 51	26	-2 3/4	-9.5
N	DATA GENERAL CORP	55- 54	47 1/8	-1 1/2	-5.0
N	DATAPOINT CORP	18- 41	55	-3 3/4	-9.6
N	DIGITAL EQUIPMENT	37- 53	44 5/8	- 5/8	-1.5
N	ELECTRONIC ASSOC.	2- 5	2 5/8	- 1/8	-4.5
A	ELECTRONIC ENGINEER.	8- 14	12 1/4	-1	-7.5
O	FOUR-PHASE SYSTEMS	13- 25	18 1/2	-2 1/4	-10.8
N	FOXBORO	50- 54	29 5/8	-2	-6.5
O	GENERAL AUTOMATION	6- 9	6 5/8	- 5/8	-5.5
O	GRI COMPUTER CORP	1- 1	5/8	+ 1/8	+25.0
N	HEWLETT-PACKARD CO	69- 87	69 1/2	-1 5/8	-2.2
N	HONEYWELL INC	43- 55	45 5/8	-1	-2.2
N	IBM	245-286	246 1/8	-4 5/8	-1.7
O	MANAGEMENT ASSIST	5- 10	8 5/8	- 3/4	-8.0
O	MICRODATA CORP	7- 18	10 1/4	-1 3/4	-14.5
O	MODULAR COMPUTER SYS	5- 9	7 1/4	-1 3/8	-15.9
N	NCR	52- 47	57 1/4	-1 5/8	-4.1
O	PRIME COMPUTER INC	12- 25	20 1/2	-5 1/4	-13.6
N	PERKIN-ELMER	17- 22	18 1/2	- 7/8	-4.5
N	RAYTHEON CO	16- 55	29 1/4	-5 5/8	-10.5
N	SPERRY RAND	50- 42	55 1/4	- 5/8	-1.7
O	SYCOR INC	8- 20	18 7/8	- 5/8	-5.2
A	SYSTEMS ENG. LABS	5- 15	11 5/8	- 5/8	-5.2
A	WANG LABS.	10- 14	12	-1 3/8	-10.2

LEASING COMPANIES

EXCH		1977-78 RANGE (1)	CLOSE JAN 11 1978	WEEK NET CHNGE	WEEK PCT CHNGE
O	ALANTHUS CORP	3- 8	5 5/8	+1	+21.6
O	BOOTHE COURIER CORP	8- 14	13 1/4	- 3/8	-4.3
O	COMDISCO INC	10- 15	14 1/2	+ 1/4	+1.7
A	COMMERCE GROUP CORP	1- 3	3/4	0	0.0
A	COMPUTER INVSTRS GRP	1- 2	7/8	+	+7.6
N	DATRONIC RENTAL	0- 2	1 1/4	- 1/8	-9.0
A	DCL INC	1- 5	2 7/8	- 1/8	-4.1
N	DPF INC	6- 10	8	- 1/2	-5.8
N	ITEL	15- 22	18	-1 1/2	-7.6
N	LEASCO CORP	19- 27	25 1/2	-1 1/8	-4.3
O	LEASPAC CORP	1- 2	1 1/2	- 1/4	-14.2
O	NRG INC	1- 1	1/8	0	0.0
A	PIONEER TEK CORP	3- 11	5 1/2	- 1/8	-2.2
N	U.S. LEASING	10- 18	12 3/4	- 1/2	-5.7

EXCH: N=NEW YORK; A=AMERICAN; P=PHIL-BALT-WASH
L=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

SOFTWARE & EDP SERVICES

EXCH		1977-78 RANGE (1)	CLOSE JAN 11 1978	WEEK NET CHNGE	WEEK PCT CHNGE
O	ADVANCED COMP TECH	0- 2	1 1/2	+ 1/8	+9.0
O	ANACOMP INC	7- 10	8 5/8	- 1/4	-2.8
A	APPLIED DATA RES.	5- 10	8 1/4	- 7/8	-9.5
N	AUTOMATIC DATA PROC	23- 50	27	-1 1/4	-4.4
O	COLEMAN AMERICAN COS	2- 2	1 3/4	0	0.0
O	COMPU-SERV NETWORK	9- 15	10 3/4	- 1/2	-4.4
O	COMP ELECTION SYSTMS	6- 10	9 1/2	0	0.0
O	COMPUTER HORIZONS	1- 1	3/4	- 1/4	-25.0
O	COMPUTER NETWORK	8- 11	9 3/8	- 3/8	-5.8
N	COMPUTER SCIENCES	7- 10	8 1/4	- 5/8	-7.0
O	COMPUTER TASK GROUP	1- 2	1 1/2	- 1/4	-14.2
O	COMPUTER USAGE	1- 5	1 5/8	+ 1/8	+8.3
O	COMSHARE	5- 8	6	-1	-14.2
O	DATA DIMENSIONS INC	5- 5	4 5/8	- 1/8	-2.7
O	DATATAB	1- 2	1 3/8	0	0.0
N	ELECTRONIC DATA SYS.	14- 20	14 5/8	-1	-6.3
O	INSYTE CORP	2- 3	1 1/8	- 1/8	-10.0
O	LPS COMPUTER MARKET.	1- 2	2 1/4	0	0.0
O	KEANE ASSOCIATES	3- 4	3 5/8	0	0.0
O	KEYDATA CORP	1- 3	1 1/4	0	0.0
A	LOGICON	7- 17	11 1/4	-1 7/8	-14.2
A	MANAGEMENT DATA	1- 2	1 1/4	+ 1/8	+11.1
A	NATIONAL CSS INC	10- 18	15 7/8	-1 3/4	-9.9
O	NATIONAL DATA CORP	4- 7	6 3/4	- 5/8	-8.4
A	ON LINE SYSTEMS INC	16- 22	16 7/8	-1 3/8	-7.5
N	PLANNING RESEARCH	3- 6	4 1/8	- 1/4	-5.7
O	PROGRAMMING & SYS	1- 1	1/2	+ 1/8	+55.5
O	RAPIDATA INC	2- 3	2 1/2	- 3/8	-13.0
O	REYNOLDS & REYNOLDS	17- 21	19	-1	-5.0
O	SCIENTIFIC COMPUTERS	1- 4	5 3/4	- 1/4	-8.7
O	TYMSHARE INC	14- 25	20 1/4	-2 1/8	-9.4
A	URS SYSTEMS	4- 3	4 3/8	- 3/8	-7.5
N	WYLY CORP	1- 2	7/8	0	0.0

PERIPHERALS & SUBSYSTEMS

EXCH		1977-78 RANGE (1)	CLOSE JAN 11 1978	WEEK NET CHNGE	WEEK PCT CHNGE
N	ADDRESSOGRAPH-MULT	10- 18	14	- 3/4	-3.0
O	ADVANCED MEMORY SYS	7- 9	6 5/8	- 7/8	-11.0
N	AMPEX CORP	8- 11	10 1/8	+ 1/8	+1.2
O	ANDERSON JACOBSON	3- 8	4 7/8	- 1/8	-2.5
N	APPLIED DIG DATA SYS	10- 20	12 5/8	- 7/8	-6.4
O	BEEHIVE INT'L	5- 12	3 1/2	- 3/8	-6.3
A	BOLT,BERANEK & NEW	6- 9	5 3/4	-1 1/8	-16.5
N	BUNKER-RAMO	8- 13	11	- 1/2	-4.5
A	CALCOMP	3- 5	2 5/8	- 1/4	-8.6
O	CAMBRIDGE MEMORIES	1- 4	2 5/8	- 5/8	-20.3
N	CENTRONICS DATA COMP	17- 30	18 3/4	-1 1/4	-8.9
O	COGNITRONICS	1- 1	1	-	-5.3
O	COMPUTER COMMUN.	5- 8	8 5/8	- 3/8	-5.5
O	COMPUTER CONSOLES	4- 7	3 3/4	- 1/4	-6.2
A	COMPUTER EQUIPMENT	2- 4	5 1/4	- 1/4	-7.1
O	COMPUTER TRANSCEIVER	1- 1	1 5/8	0	0.0
O	CONTEN	9- 13	9 1/2	- 3/4	-7.5
N	CONRAC CORP	19- 28	20 3/4	-1 3/4	-7.7
O	DATA ACCESS SYSTEMS	4- 5	5 1/4	0	0.0
O	DATA 100	6- 11	8 5/8	- 3/4	-8.0
A	DATA PRODUCTS CORP	9- 19	15	-1 1/2	-9.0
O	DATA TECHNOLOGY	3- 4	4 1/4	0	0.0
O	DATUM INC	1- 2	2	0	0.0
O	DECISION DATA COMPUT	2- 5	1 3/4	- 1/8	-6.6
O	DELTA DATA SYSTEMS	1- 1	5/8	0	0.0
A	DOCUMATION INC	6- 11	9	-1	-10.0
O	DATARAM CORP	2- 24	19	-2 1/2	-11.6
N	ELECTRONIC M & M	4- 5	4	- 1/2	-11.1
O	FABRI-TEK	1- 2	1 1/8	0	0.0
O	GENERAL COMPUTER SYS	0- 2	1 1/2	- 1/4	-14.2
N	HAZELTINE CORP	8- 12	9 3/4	- 1/2	-4.8
N	HARRIS CORP	28- 47	39 3/4	-4 5/8	-9.9
A	INCOTERM CORP	10- 19	17 7/8	- 1/4	-1.5
O	INFOREX INC	4- 7	5 5/8	-1 1/4	-18.1
O	INFORMATION INTL INC	8- 14	8 1/2	- 1/2	-5.5
O	INTEL CORP	58- 57	41 1/2	-3	-6.7
A	LUNDY ELECTRONICS	3- 8	3 5/8	- 1/4	-6.8
O	MSI DATA CORP	6- 15	11 1/2	-2 5/8	-17.1
O	MEMOREX	23- 34	27 1/4	-2 3/4	-9.1
N	MOHAWK DATA SCI	5- 8	5 3/4	- 1/4	-4.1
O	PENRIL CORP	2- 6	5 1/2	- 3/4	-12.0
N	PERTEC CORP.	7- 11	8 5/8	-1 5/8	-15.7
A	POTTER INSTRUMENT	2- 2	1 3/4	0	0.0
O	PRECISION INST.	2- 2	2	0	0.0
O	QUANTOR CORP	3- 5	5 1/4	0	0.0
O	RECOGNITION EQUIP	6- 10	7	- 1/8	-1.7
O	SCAN DATA	1- 2	1	0	0.0
O	STORAGE TECHNOLOGY	10- 22	19 1/8	-1 7/8	-8.9
O	T BAR INC	7- 13	11	-2 1/8	-16.1
O	TALLY CORP.	4- 8	4	- 1/4	-5.8
A	TEC INC	7- 10	6 3/4	- 1/8	-1.8
N	TEKTRONIX INC	29- 40	34	-3 1/8	-8.4
N	TELEX	2- 3	2 7/8	- 1/8	-4.1
O	WILTEK INC	1- 1	1/2	- 1/8	-20.0

SUPPLIES & ACCESSORIES

EXCH		1977-78 RANGE (1)	CLOSE JAN 11 1978	WEEK NET CHNGE	WEEK PCT CHNGE
A	AMERICAN BUS PRODS	6- 8	7 1/8	- 1/8	-1.7
O	BALTIMORE BUS FORMS	1- 4	1 7/8	+ 1/8	+7.1
A	BARRY WRIGHT	10- 17	14 5/8	-1 3/8	-8.5
O	CYBERMATICS INC	1- 1	7/8	- 1/8	-12.5
O	DUPLEX PRODUCTS INC	14- 20	18 5/8	-1 5/8	-8.1
N	ENNIS BUS. FORMS	6- 8	8 1/8	- 1/8	-1.5
O	GRAPHIC CONTROLS	13- 18	16 1/2	- 1/2	-2.9
N	3M COMPANY	43- 36	46 1/4	- 3/4	-1.5
O	MOORE CORP LTD	24- 57	26 1/4	- 1/2	-1.8
N	NASHUA CORP	16- 28	17 3/4	- 7/8	-4.6
O	STANDARD REGISTER	18- 23	21 3/4	0	0.0
O	TAB PRODUCTS CO	8- 19	7 5/8	- 1/2	-6.1
N	UARCO	18- 22	19 1/2	-1 1/8	-3.4
A	WABASH MAGNETICS	10- 13	11	- 1/2	-4.3
N	WALLACE BUS FORMS	17- 21	18 7/8	-1 1/2	-7.5

"Intel delivers PDP-11/70 memory with MOS performance, ECC-and no waiting. We planned it that way."

We're really proud of our add-on memory for your PDP®-11/70. Here's why.

First, we'll ship it when you need it. No waiting. We invented semiconductor memory, manufacture our own components and deliver more bits of memory every year than any other company.

No one has more experience in MOS memory technology than our design team. They've designed our in-1670 for PDP-11/70 to deliver optimum reliability, with the features you need. Error Correction Coding and Error Logging, for example, mean that single bit errors are corrected automatically, and logged to simplify preventive maintenance.

We designed our in-1670 for easy expansion, too. It gives you up to two megabytes in a single frame. As your needs grow, you can expand easily by adding memory cards in convenient 128K byte increments.

We're proud of our worldwide service organization, too. It's the support you'd expect from the independent that delivers more memory systems than anyone.

Finally, there are economic advantages. Choosing Intel can give you clear-cut cost savings. And the added peace of mind you get when you go with a leader. That's true of all our memory systems, for PDP-11 and LSI-11 computers, and 370 computers, too.

Why wait? Pick up the phone and call your local Intel sales office. Or, for more information, call us at 408/734-8102 or use the coupon below.

intel® delivers.

Intel Memory Systems
1302 N. Mathilda Avenue, Sunnyvale, CA 94086 CW11678
Send me more information on memory for my
PDP-11/______, LSI-11______ Other______
Call Me____/______
Name______
Company______ Position______
Address______
City, State, Zip______